COAL AGE

Vol. 11 NEW YORK, MARCH 10, 1917 No. 10

A Creed for Executives

By BERTON BRALEY

Written expressly for "Coal Age"

These things I believe in: Myself and my work,
My men who mine coal in the dust and the murk,
My home and my country; and though it is blind
And oftentimes stupid, I've faith in mankind.

Myself I believe in—for were I without
That faith, I could never do what I must do;
I'd temporize, question and waver and doubt,
I'd rarely get started—and never get through.

Belief in my job?—If I hope to succeed,
That sort of belief I most vitally need;
And therefore I hold with my whole heart and soul
That in the efficient production of coal
I serve my employers, my state and my nation,
And aid in the building of civilization.

My men I believe in and work with and trust,
For one must have faith if he hopes to be just;
And he who seeks service that's loyal and square
Himself must be loyal—and play the game fair.

My home I believe in—my children and wife—
For whom I go forth to do battle with life;
And since, when I look the world over, I find
That all of the nation and all of mankind
Is made up of men and their loved ones—why, then
I *have* to believe in the whole world of men.

So that is my creed; I believe I am here
To do my work well, and to hold myself clear
Of greed and suspicion; for out of life's stress
It's only by Service we win true Success.

Play the game fair.

I believe in myself and my work.

Ideas and Suggestions

Aids in Estimating Concrete Costs

The Cement Tile Machinery Co., of Waterloo, Iowa, has issued for users of concrete a pamphlet entitled "The Concrete Dope Book," in which much information of interest to those engaged in mining or metallurgical construction can be found. The following data in regard to concrete estimations should prove useful—keeping in mind that a factor of 10 to 20 per cent. should usually be added for mining or metallurgical work to allow for greater difficulties of mine construction. The data in the pamphlet are based on practice in cities where conditions are better than those found during the construction period at mines or metallurgical works.

For plain work, such as dams, retaining walls, etc., the cost of framing and erecting forms is estimated at between $7 and $8 per M. ft., b.m., while the cost of tearing down is estimated at $2 per M. The cost of erecting and removing forms for general work is declared to be about 1c. per sq.ft. of wall surface to be formed. In reinforced-concrete building work it is estimated that forms erected will cost about 8c. per sq.ft. of form surface. Another rule for estimating ordinary wall work where rough lumber is used, is to allow 50 to 75c. per cu.yd. of concrete. This price includes the cost of lumber and labor for framing both sides of the wall.

A rule for estimating labor costs on concrete is to allow one man one day for each ¾ yd. of concrete used, to assume that two men will average 1 cu.yd. of concrete, including the building of the forms. For ordinary reinforced-concrete walls the labor can generally be estimated by allowing one man one day for 1½ cu.yd. of concrete. For concrete columns and pilasters the labor can be estimated by allowing one man one day for each cubic yard of concrete used. A four-man crew mixing by hand will average about 9 cu.yd. per day, provided the material is not wheeled more than 50 ft. Mixing by hand costs approximately 5c. per cu.yd. for each turn given the mixture. One man will mix, place and finish on an average 100 sq.ft. of 4-in. concrete floor in 10 hr. Material can be shoveled at a cost of about 10c. per cu.yd. Wheeling material an average of 50 ft. costs approximately 6c. per cu.yd. Cement can be unloaded from car directly to storage bins at a cost of approximately 2c. a barrel, and if unloaded by wheelbarrows and wheeled a distance of 100 ft., the cost will probably be about 3c. per barrel. The cost of loading concrete into wheelbarrows is approximately 4c. per cu.yd. It is generally estimated that a man will mix by hand about 2½ cu.yd. of concrete per day. The cost of handling concrete by spouting is usually about 70c. per cu.yd. A man will tamp thoroughly about 25 cu.yd. of material into a layer 6 in. thick in 10 hr. For ordinary work, such as retaining walls, arches, culverts, etc., the cost of placing steel is from ¼ to ½c. per lb. In reinforced-concrete building the cost of placing steel is ¾ to 1c. per lb. The cost of finishing walls where forms have been used is about 1c. per sq.ft.

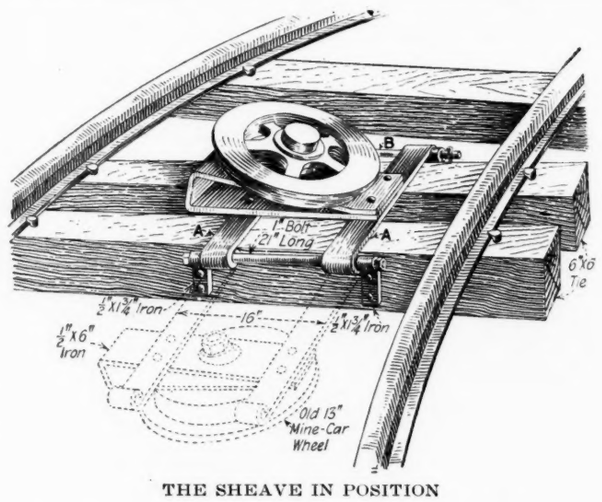
The cost of loading sand and gravel into cars is approximately 20c. per cu.yd. The cost of shoveling sand direct from car to storage bin is generally from 6 to 10c. per cu.yd. One man will usually load from 15 to 20 cu.yd. of sand into wagons in 10 hr. The cost of hauling sand by teams is about 26c. per mile. A cubic yard of sand, gravel and crushed stone is a fair load for a team. A man and team using an ordinary dump ore wagon will load and haul on an average 5 loads of sand a distance of 1½ mi. from pit to storage in 9 hr. The cost of loading sand, stone or gravel in wheelbarrows is approximately 12c. per cu.yd. Cost of washing sand and gravel is about 20c. per cu.yd. with work done by hand. These factors should prove of assistance in estimating and planning concrete work.

Useful Angle Sheave

By A. C. Watts*

The accompanying illustration shows a rather useful angle sheave devised by the operating department of the Castle Gate mine of the Utah Fuel Co.

This device is made of odds and ends and is for temporary use along slopes where entries are being turned



THE SHEAVE IN POSITION

off and where it is necessary to move undercutting mining machines from one entry to another across the slope.

In order to prevent the hoisting rope from swinging over to the sides of the slope and wearing against the ribs when the trip of cars is lowered into or hauled out of a level entry, some kind of sheave must be provided. Usually these are permanently installed, but they must be high enough to catch the rope when it is nearly at the height of the drawbar of the car and, consequently, they are too high for an undercutting mining machine truck to pass over.

*Chief engineer, Utah Fuel Co., Salt Lake City, Utah.

This difficulty was overcome by hinging the carriage of the sheave so that when the cutting machine had to pass over it it could be turned upside down between two ties, as shown in broken lines in the foreground.

The hinge is shown at *A A* in the plan. The bolt *B* is simply for holding the carriage rigid when the rope is in the sheave and the side and lifting stress is upon it. When it is desired to reverse the sheave this bolt is taken out, which frees the carriage. The drawing is sufficiently in detail to show the working plan.

An Economical Prospect Hoist

One of the simplest, cheapest and yet most satisfactory and economical hoists one could wish for use in preliminary mine exploration can be rigged up from an ordinary 3- or 5-hp. gasoline engine. It was formerly the custom to employ a horse whim for that period in shaft sinking that occurs before the windlasser really dreams of a mechanical hoist. That was in the days of yore, before precedent and example showed the miner that a gallon or two of gasoline or distillate is cheaper than horse feed, says W. C. Rehfuss in the *Engineering and Mining Journal*

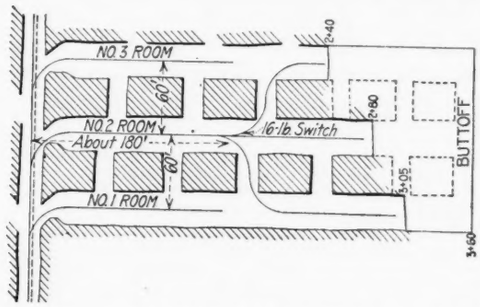
The equipment shown in the illustration is installed at a small mine at Westpoint, Calif., in what is known as the East Belt of the Mother Lode. The whole contrivance, which is home-made, is operated by a 3-hp. Sampson gasoline engine. It hoists a bucket containing 500 lb. of rock from the bottom of a shaft 110 ft. deep in 1¼ min. Its cost of operation in this land of high freight rates (30 mi. from a railroad) is about 8c. per hr., running at capacity, but usually averages only 30c. a day.

A loose belt is employed on the drum, so that when the tightener pulley is released and the brake put on, the bucket can be stopped at any desired place, though the engine continues running, the small pulley on the countershaft turning inside of the loose belt. A third lever, or throttle for the engine, is provided so that the engine may be throttled down while not actually hoisting. It is of great convenience to have all the regulating levers placed near the collar of the shaft, so that the hoistman may handle the bucket and attend to its unloading, where no automatic dumping device is provided. It is essential that a powerful band brake be employed, strong enough to hold a fully loaded bucket at all times.

Suggestion for Room Tracks

By Engineer*

The following is a suggestion for room tracks where electric gathering motors are used. The advantages are: 30 to 50 per cent. of time saved (according to length of room) or a corresponding increase in the tonnage; 30 to 50 per cent. saved in the wear on the motor; 30 to 50 per cent. saved in the wear on the cable; 83⅓ per cent. saved in running under the trolley wire at the room neck, which in itself is quite an item in low coal, especially where safety is considered as being of prime importance.



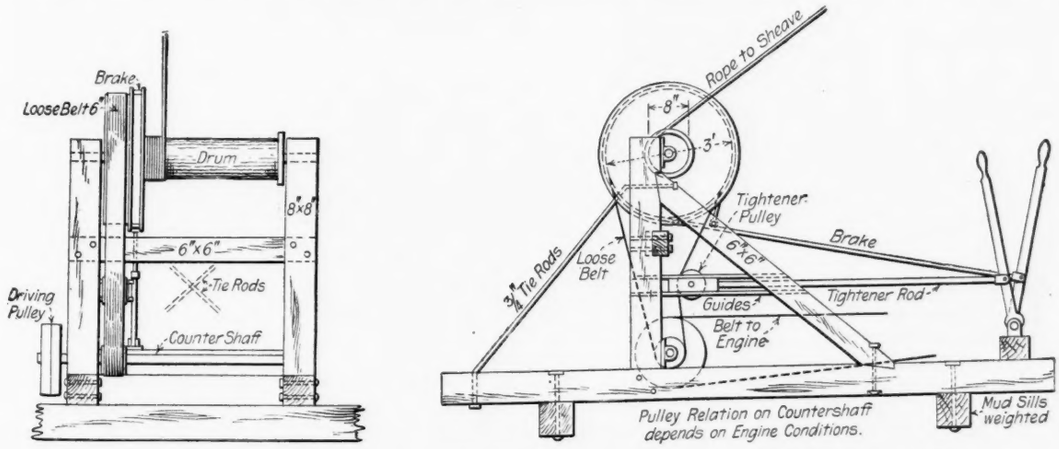
ARRANGEMENT OF TRACKS IN ROOMS TO SAVE RAILS

In the rooms to the right and left of the center room the track (laid on steel ties) up to the third crosscut would not be required for a period of six months or more, or until the pillars were brought back to that point, and could be used in the face of the room, thus effecting a saving in steel. But the main advantage is in the reduction of the time otherwise wasted, for the locomotive does not have to travel the full length of three long rooms every time it gathers a trip.

The expense involved would be for furnishing two No. 16 switches provided with wood ties (these, however, could be used over again in other rooms) and for the labor in laying the two switches and relaying the track from the third crosscut to the entry.

I would be glad to hear from readers who are using this method, or from those familiar with it, giving advantages or disadvantages inherent to its employment and not mentioned here.

*Stone, Ky.



A HOME-MADE BELT-DRIVEN PROSPECT HOIST OPERATED BY GASOLINE ENGINE

Scientific Methods of Coal Buying—III

By John B. C. Kershaw

SYNOPSIS—This concluding article describes the determination of the ash, volatile matter, etc. Necessity of making approximate analysis under exactly similar conditions. Difficulty of obtaining accuracy in calorimeter work.

The further tests of the fuel that will now be dealt with embrace the tests for ash, volatile matter, coke, fixed carbon and the calorific value as determined by actual trial in a calorimeter. All these tests are carried out with the 10-gram sample of fuel used for the moisture test, after this has been weighed and the loss on drying determined.

The whole of this 10-gram sample is first reduced very fine, by grinding it in a steel mortar and by repeatedly passing the ground sample through a 60-mesh sieve, until nothing remains on the sieve. This operation demands much time and patience, when very hard fuels or those containing much slate and scale are being dealt with. On no account, however, must the work be shortened by rejecting the lumps and particles that are hardest to grind; for, as a rule, these are the least valuable portions of the sample and have the most effect upon the ash and calorimeter tests. As stated in the introductory part of the previous article, correct sampling is the basis of correct testing; and if the sampling be badly or carelessly performed, the whole of the test results are vitiated. The time spent in preparing the sample must not be curtailed by omitting to observe any of the rules or precautions given in this and the previous articles.

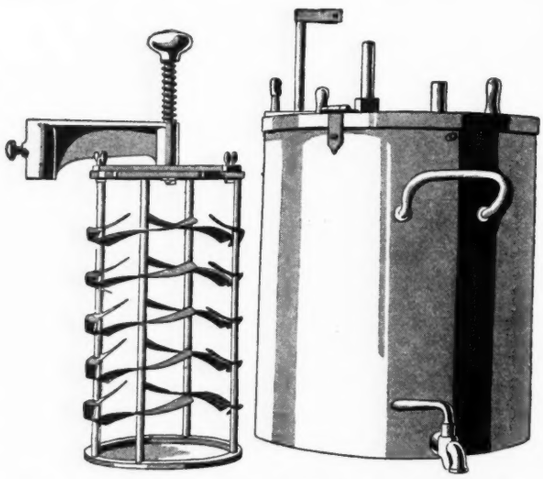


FIG. 1. WATER-JACKET VESSEL FOR PREVENTION OF RADIATOR LOSSES

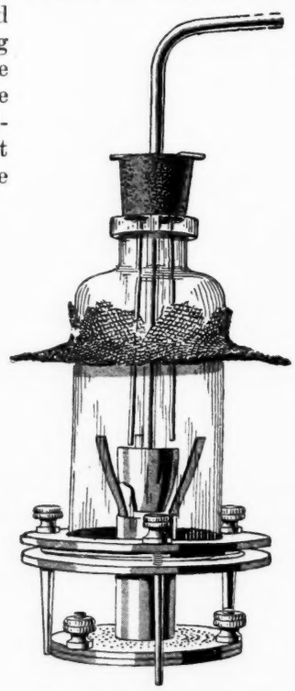


FIG. 2. BELL TYPE OF CALORIMETER

The Ash Test

The finely ground sample is now well mixed with a large spatula on a glazed sheet of paper and is redried in the air bath at 230 deg. F. for half an hour, in order to expel the moisture taken up during the final grinding operation.

The ash test is made by heating 2 grams of this sample in a No. 00 size porcelain basin, over a Bunsen-burner flame, until all the hydrocarbon gases are driven off and the fixed carbon that remains is completely burnt away. The heating should be carried out very gradually, in order to give the hydrocarbon gases opportunity to escape without caking the coal; for if the coal cakes and a hard lump of coke forms, the combustion of the fixed carbon will prove a very lengthy process. If the preliminary heating has been sufficiently slow, however, the particles of coal will remain quite detached one from the other, and the burning off of the fixed carbon can be completed in half an hour. The heating should be continued, until no black specks of unburned carbonaceous matter are visible in the gray or reddish colored ash.

In order to obtain more rapid combustion of the fixed carbon, it is well to support the basin upon an asbestos board, cut to fit it, and to tilt the tripod stand upon which this asbestos board is placed. The CO_2 and other gases produced by the Bunsen burner then pass away without interfering with the supply of air to the fuel in the basin, and the combustion of the fixed carbon will occur more rapidly. When the process of burning off is quite finished, the basin and its contents are allowed to cool; and the weight of the latter, multiplied by 50, gives the percentage of ash in the dry fuel. An average coal will contain 5-to 8 per cent. of ash. Washed (or picked) samples of good coal will contain as low as 3 per cent. of ash, while poor coal and dirty slacks contain up to 16 and 20 per cent. of ash. I have even tested samples of slack containing 33 per cent. of ash. In order to find the percentage of ash in the wet fuel, the results are multiplied by a factor denoting the percentage of dry fuel in the coal as delivered. For example, if the fuel contains 10 per cent. of moisture, every 100 tons as delivered will contain 100 — 10 = 90 tons of dry fuel, and the factor for conversion of the ash test will be 0.9.

Heating the Test Sample

Volatile matter, coke and fixed carbon tests are all carried out by heating 1 gram of the finely ground sample in a closed platinum crucible, until all the hydrocarbon gases are expelled, and then weighing the residue. The test is thus a simple and expeditious one. Several precautions, however, must be observed in order to obtain reliable and concordant results, and the test must always be carried out under the same conditions, as re-

gards the size of crucible, the gas pressure and the height of flame used.

The crucible should be 1.4 in. high and 1.1 in. in diameter, and should be provided with a very close-fitting cover. It must be supported on a platinum-wire triangle made by twisting together three pieces of thick platinum wire, and by mounting these in the center of an ordinary clay pipe-stem triangle. This enables the flame to play all around the crucible and prevents any access of air to its contents during the heating. The Bunsen burner must produce a flame at least 7 in. high under the normal conditions of gas supply, and the crucible must be supported on the tripod in such a way that its bottom is not more than 1½ in. above the top of the burner. A circular screen must be arranged round the burner and tripod stand to prevent side drafts, and it is well to carry out the test under a draft hood, since much smoke and soot are produced when bituminous fuels are being dealt with.

Having prepared this apparatus and made a trial heat of the empty crucible in order to see that it is completely enveloped in the flame, and that no air has access to its cover, the 1 gram of dry, finely ground fuel is carefully weighed into the crucible, and, the cover being placed in position, the heating is started with the full pressure of gas. The crucible will attain a red heat in about half a minute, and the evolution of the hydrocarbon gases, which escape and burn around the lid of the crucible, will commence immediately after this.

As a rule, the evolution of these gases lasts 1 to 1½ min., and the character of the flame and time during which the gases escape enable one roughly to class the coal as bituminous, semibituminous or anthracitic. When the last luminous "candle" has disappeared from above the lid, and the transparent flame of the Bunsen burner is seen once again, the gas is turned off, the crucible allowed to cool, and at once weighed, in order to determine the loss of weight. Since 1 gram of fuel was used for the test, the loss of weight multiplied by 100 gives the percentage of volatile matter contained in the dry fuel, while the weight of the button of coke multiplied by 100 gives the percentage of coke.

Corrections for Decomposition of the Hydrocarbons

When testing highly bituminous fuels containing 30 to 40 per cent. of volatile matter, a thick deposit of soot will be found on the under side of the crucible cover, and also a thick deposit of flaky graphite on the inside walls of the crucible, due to the decomposition of the hydrocarbon gases at a red heat, in the absence of oxygen. The weight of these combined deposits amounts in these cases to about 15 milligrams, or to 1.5 per cent. on the test. Should it be thought wise to make corrections for these deposits, the following method may be used.

The soot can be removed easily before weighing the crucible by first wiping the inner side of the cover with cotton wool and then raising it to a red heat in the top of a Bunsen-burner flame. The crucible containing the coke button must be kept covered by another closely fitting lid in the desiccator while this cleaning of the soot-covered lid is carried out. It is more difficult to allow for the graphite. If the crucible be inverted, and tapped gently after the final weighing, the button of coke at the bottom will become detached and fall out, while the graphite will adhere to the walls of the crucible. Any particles of coke that remain on the bottom of the crucible can be detached easily with a spatula or forceps, and on reweighing the crucible, with only the graphite inside, one obtains the correction necessary for the weight of the latter.

As a general rule this amounts to between 6 and 9 milligrams. It is deducted from the coke and added on to the volatile matter, for this graphite, it must be remembered, has been formed by the decomposition of portions of the escaping hydrocarbon gases, at a red heat.

Coke and Fixed Carbon

A lead counterpoise, which just balances the platinum crucible and lid, facilitates the rapid weighing of the crucible and its contents for the coke test, since the weights used then represent directly the weight of coke and graphite in the empty crucible. From these the percentages of volatile matter and fixed carbon are easily calculated.

The exterior of the platinum crucible used must be kept bright and clean by rubbing with wet sea sand after each test, and frequent adjustment of the lead counterpoise will be necessary, in order to allow for the slight loss of weight that results from this cleaning.

As an example of the figures obtained in the coke test, the following may be given, it being assumed that a lead counterpoise has been used to balance the crucible and lid and that the soot has been removed from the crucible lid in the manner described.

	Grams
Weight of fuel used	1.000
Weight of button of coke and graphite left in crucible	0.707
Weight of graphite alone	0.009

The graphite represents decomposed hydrocarbon gases, so 0.009 is deducted from 0.707, and one obtains 0.698 as the correct weight of the button of coke. Multiplied by 100, this gives 69.80 per cent. for the coke test and (deducting 69.8 from 100) 30.20 per cent. for the volatile-matter test of this fuel.

The fixed-carbon percentage is also obtained from these same figures by deducting from the coke percentage the percentage of ash found in the earlier test. Assuming that in this case the ash was 15 per cent., we have (69.80 — 15) 54.80 per cent. for the fixed carbon.

These results are all on the dry fuel sample, and if the tests are required for the fuel as delivered, the method of correcting by a factor, as already described under the ash test, is employed.

This completes the approximate analysis of the fuel, and, as shown, when once the sampling operations have been properly performed and a finely ground sample of the dried fuel is available, these tests can be carried out in from 1½ to 2 hours; for while the carbon of the 2-gram sample is being burnt away for the ash test, the coke test can be proceeded with and finished.

It must be understood that the coke and volatile matter tests are what chemists term "empirical" tests—that is, they represent not original or permanent constituents of the coal, but decomposition products, obtained when the coal is heated—therefore the results will vary with the temperature attained and time for which the heating is continued. Unless, therefore, the test is carried out each time under exactly similar conditions, concordant results cannot be expected.

The laboratory determination of the calorific, or heating, value of a fuel is carried out by burning a weighed amount of the dried sample in oxygen, under water, and by noting the increase of temperature of the latter resulting from the heat generated by the combustion. If the weight of the water by which the sample is surrounded be known, and if the whole of the heat be abstracted from the gaseous products of combustion, the rise in temperature of the water, multiplied by its weight, gives the number of heat units developed by the burning of the fuel. Two sets of units are in use—the British thermal unit, or B.t.u., which represents the heat required to raise 1 lb. of water through 1 deg. F., and the calorie, or metric unit, which represents the heat necessary to raise 1 gram of water through 1 deg. C.

If large quantities of fuel be employed in these determinations, the heat losses due to the size of the apparatus required, and to radiation, are proportionally high and difficult to allow for. The chemist surmounts this difficulty by taking great care in the preparation of the sample used for the calorimeter determination and by working with a comparatively small amount of fuel. The general practice is to use only 1 gram of fuel for the calorimeter test and special precautions are therefore necessary to obtain the required degree of accuracy in the weighing and temperature measurements. Some chemists prefer to work with only one-half this amount, and, in this case, the rise in temperature of the water is usually less than 1 deg. C. and all corrections for radiation losses can be dispensed with. Very accurate and standardized thermometers, which can be read to $\frac{1}{100}$ of one degree, are needed, however, when working with such small amounts of fuel.

Oxygen is used for the combustion, although air would be more in accordance with the conditions of practical work. The difficulties of igniting and burning a coal sample in a current of air, in a confined space, without smoke and soot production, are so great, however, that oxygen has been generally accepted as the only possible substitute.

Bomb and Bell Types of Calorimeter

Two methods of its application are in use. Either the fuel sample is burned under normal atmospheric pressure in a calorimeter of the "submerged bell" type, or the fuel is burned under high pressure in the "bomb" type of calorimeter. In skilled hands either method gives reliable and concordant results, but since the decomposition products of coal vary in character with the temperature, the calorific values obtained by the bomb are higher than those obtained by the bell.

When using either the bomb or the bell type of calorimeter, it is essential to have some protection against temperature exchanges between the vessel holding the measured volume of water and the outside air. Fig. 1 shows the form of outer vessel I use. An outer water-jacketed vessel containing a stirrer incloses an inner air space, in which the nickel-plated highly polished vessel containing the water is supported on three small heat-insulating corks. When in position, the nickel vessel is thus surrounded by an air jacket and a water jacket, and if a round asbestos board or plate with the necessary openings in it for the thermometer, electrical ignition wires and oxygen supply tube be employed to close the top of the vessel, the temperature exchanges with the outside air will be reduced to a minimum. Fig. 4 also shows the mechanical stirrer, used at the end of the test to obtain a thorough mixture of the water in the inner vessel. Electrical ignition is requisite with both types of calorimeter.

A small briquette, or tabloid, mold completes the apparatus required for fuel calorimeter work, since if it be attempted to burn the fuel in powdered form, it will be found that low results are obtained. This deficiency is due to portions of the fuel being blown onto the metal base of the bell, when the ignition starts, and also to the ash which will form above and cover the lower layers of fuel, as the combustion approaches completion. This necessity for pressing the fuel into small pellets, or briquettes, extends also to bomb tests, since, if the fuel is in powdered form, some portion of it is thrown against the internal walls of the bomb by the force of the explosion and it there escapes combustion.

Bituminous fuels will, as a rule, form pellets, or briquettes, by pressure alone. In cases where sufficient tarry

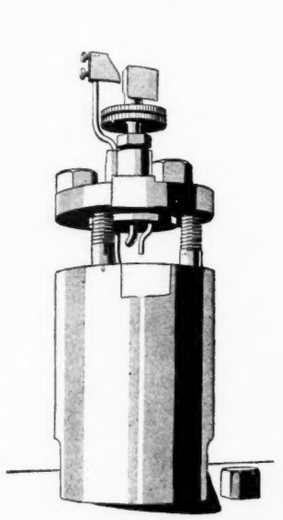


FIG. 3. BOMB TYPE OF CALORIMETER

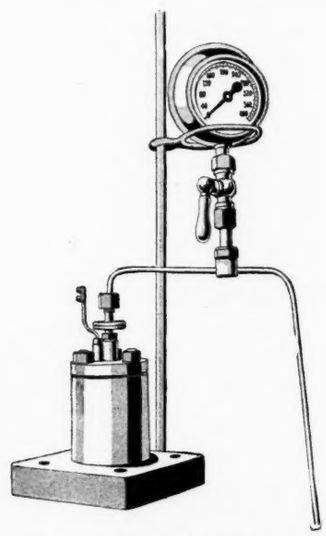


FIG. 4. BOMB CALORIMETER CONNECTED TO PRESSURE

matter is not present in the natural fuel, I use just sufficient of a 1 per cent. solution of gum arabic to make the particles of fuel adhesive. For half a gram of fuel, three small drops of such a solution are sufficient. The pellets, or briquettes, must be heated in the air path at 230 deg. F. (110 deg. C.) at least 4 hours to expel the last traces of moisture thus introduced, before testing in the calorimeter.

Accuracy in calorimeter work can only be attained by practice and by close attention to minute details, which cannot be set out in this article. Readers are referred, therefore, to the handbook on this subject named below[1] for more complete information as to the methods of observation.

Description of Calorimeters

The Darling bell form of calorimeter is illustrated in Fig. 2 and consists of a glass bell jar closed by a rubber cork and provided with a glass flange below, ground quite level on its lower side. By the aid of rubber rings,

[1] "Fuel, Water and Gas Analysis for Steam Users," by J. B. C. Kershaw. Constable & Co., London; $2.

a circular brass ring and small milled screws and nuts, the glass bell can be firmly fastened down upon a brass support, through small holes in the baseplate of which the gases produced by the combustion of the fuel have to pass, before they can escape and bubble up through the water. In order to break up the bubbles more completely, a piece of brass gauze may be fixed on the bell, as shown, or better still, a copper spiral may be fixed above the brass base, and all the gases produced by the combustion forced to pass up this spiral, before they escape through the water. I have used one of these copper spirals for years and found it of great service in extracting the last traces of heat from the waste gases in all calorimeter work. A brass tube for leading in the oxygen, and two copper conducting wires for ignition purposes, pass through the rubber cork of the bell jar.

The Mahler-Donkin bomb calorimeter is shown in Figs. 3 and 4. It consists of a massive gunmetal cylinder provided with three projecting screwed stud pins for bolting down the cover. This is shown in Fig. 3 supported on the upper ends of these stud pins. The cover is provided with a milled-head screw valve for regulating the inlet of oxygen to the cavity inside the bomb. It also possesses an insulated conducting wire, which runs through the cover and terminates above the brass wire ring used for supporting the small platinum capsule, or crucible, containing the fuel. Thin lead wire is used to make a tight joint between the bomb proper and its cover, a circular groove in the cylinder top having as its counterpart a projecting ring on the underside of the cover.

The bomb is tested up to 1800 lb. pressure before it is sent out and is plated inside with gold, in order to withstand the action of the nitric and sulphuric acids produced by the combustion of the fuel. Fig. 4 shows the bomb with the cover bolted down and the connection completed to a pressure gage, and to the oxygen-supply cylinder. Twenty to twenty-five atmospheres is the usual pressure used in these tests—that is, 300 to 375 lb. It is advisable, therefore, to have a small back-pressure valve inserted in the milled-head screw in the bomb cover, in order to avoid a great loss of gas when disconnecting the oxygen-supply pipe and gage from the bomb, after filling the same with oxygen.

At this high pressure the combustion of the coal is practically instantaneous, and the thin platinum wire used for ignition purposes will generally be found fused, owing to the temperature momentarily attained. In order to protect the platinum capsule or crucible from the same effect, and from the action of the molten slag produced, it is necessary to line it with a thin asbestos board, cut and shaped to fit the crucible, or capsule. This board must be dried and ignited before use, in order to remove all matter that might vitiate the test results.

Further details of the method of operating the Mahler-Donkin and other bomb-type calorimeters will be found in the handbook already referred to.

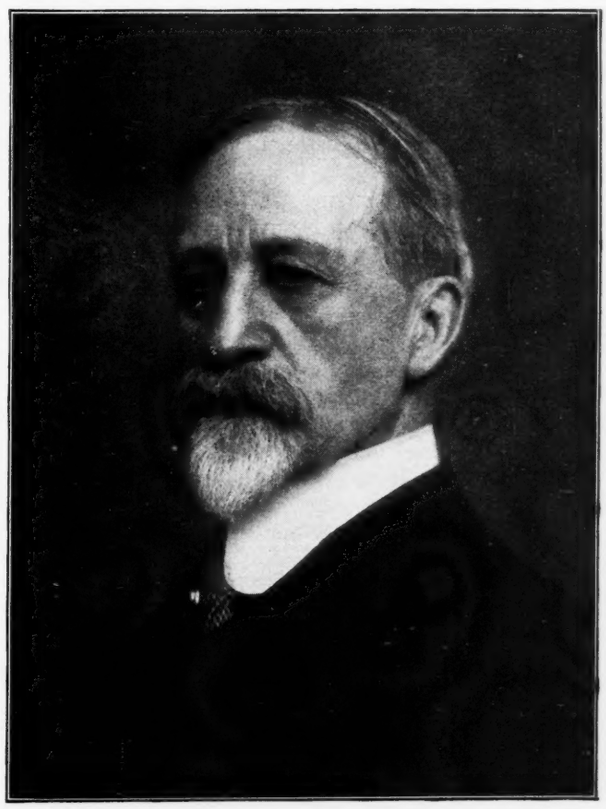
Black Shales Owe Their Color to Bituminous Matter, and most of them, if heated, will yield gas, oil and other byproducts. For many years such shales have been distilled for oil in Scotland and other European countries. The Scotch distilleries are reported to have been of the greatest aid to Great Britain during the present war in supplying the oil-burning ships of her navy, thus saving the excessive cargo rates on oil from America.—George H. Ashley in "Oil Resources of Black Shales of the Eastern United States."

Charles M. Dodson

The death of Charles M. Dodson, president of Weston Dodson & Co., large producers of both anthracite and bituminous coal, on Feb. 27, removes one of the most prominent as well as interesting figures in the coal industry. His influence, however, will continue to be felt and his works perpetuated in generations to come.

Mr. Dodson was the son of John and Sophronia (Monroe) Dodson, of Huntington Township, Luzerne County, Pennsylvania, and was born Mar. 10, 1836.

He was educated at Newton Academy, Baltimore, Md., and Luzerne Academy at Wyoming, Penn. For two years he was employed in the office of William Milnes, an anthracite operator at Jeanesville, Penn., and at Mauch Chunk. Subsequently he was with the Baltimore & Ohio R.R. at Wheeling, W. Va., going thence to Berlin,



CHARLES M. DODSON
Late president of Weston-Dodson & Co.

Wis., where he entered the office of Wheeler & Kimball, attorneys-at-law, and subsequently graduated from the Law College at Cleveland, Ohio.

Mr. Dodson was admitted to the bar by the Supreme Court of Ohio and entered partnership with Judge Wilson C. Lennert, starting the practice of law in Bucyrus, Ohio. In 1863 he came to Bethlehem and later formed a partnership with his brother under the name of Weston Dodson & Brother, with main office at Bethlehem, Penn., and branch offices at Philadelphia and New York City.

He became the president of Weston Dodson & Co., Inc., in 1908, and at the time of his death had been connected with the business for 54 years. Mr. Dodson was married in 1872 to Maria R. Craig, who survives him, as do two sons, Truman M. and Alan C. Dodson.

Recollections of a Manager

Our accounting department does not issue a voucher as full settlement for equipment purchased until the invoice for the material has been approved by the chief clerk and the division superintendent at the mine to which shipment has been made. Before the mine clerk can approve and return the invoice, he must receive and check the freight bills and any other expense bills that may properly be chargeable to the shipment.

During my career as mine superintendent, I did not realize that the application of this system often worked great hardship on manufacturers operating on limited working capital, but after assuming the manager's chair I had it brought home to me very forcibly.

My next-door neighbor in the city was a banker, and I learned from him that some of the largest borrowers at his bank were manufacturers who sold equipment to our company. When applying for credit to tide themselves over, these men often complained to him about the way in which our company ignored its promised terms of payments. When my banker neighbor made this statement I was on the defensive in a jiffy and insisted that the manufacturers were undoubtedly taking advantage of him, but he assured me that a little investigation on my part would convince me that his clients were not exaggerating in the least. I promised to investigate.

I carried out my promise and found that the information furnished the banker was correct.

If a consignment arrived at the mine in good order and was found to be complete, the invoice covering the material was immediately marked O. K. by the chief clerk and turned over to the superintendent for approval. The superintendent promptly affixed his signature and returned all papers to the chief clerk, who in turn started them promptly back on their journey to the general office.

In many cases, however, the shipment would be found to be incomplete or the material was not received in good order or the expense bills did not tally, and the chief clerk would lay the invoices aside, in compliance with the instructions from the accounting department. If the invoice happened to carry a discount for payment within a certain time, the accounting department insisted on daily reports showing progress made by the chief clerk toward having it approved, but in all other cases the invoice after once being laid aside was left pretty much to the tender mercies of the chief clerk's memory.

I found an instance where we had received about fifty thousand dollars worth of equipment from a manufacturer, and because his shipping clerk missent a few small items, invoices for the entire shipment had been held at one of our mine offices for nearly three months; this in spite of the fact that our contract with the manufacturer called for payment in full without discount within thirty days from date of invoice. This particular manufacturer had been trying for years to get some of our business, and as this happened to be his first order he felt a hesitancy about pressing us for settlement, never dreaming that the delay was caused by inadvertence pure and simple; he was one of the men that had complained to my banker friend about the way our company met its obligations, and his complaint had carried conviction because he had been forced to borrow twenty thousand dollars to meet obligations that he had pledged himself to meet on the strength of the payment due from us.

Illinois Contract Form

Appended herewith is the new type of steam contract form which has been adopted for use in the central Illinois and the Fifth and Ninth Districts. The form applies exclusively to steam coal, no domestic coal being negotiated under its terms. The contract is also accompanied by a separate memorandum, in the shape of an acceptance of the order, which is very definite and clear cut, as well as a salesman's memorandum of the order, these two items being omitted here.

Contract No.....

COAL CONTRACT

MEMORANDUM OF AGREEMENT, made at St. Louis, Mo., this.....day of....., by and between..... ....., Seller, and..... ....., Buyer.

WITNESSETH: That the Seller agrees to sell and the Purchaser agrees to buy and accept coal as hereinafter described, mined at.....Mine, located at..... County, Illinois, under the following conditions:

Period: From....., 19.., to....., 19...

GRADES AND PRICES:

QUANTITIES: (Daily, weekly or monthly) shipments to Buyer for use of (insert name of plant) shall be .....tons, minimum, to.....tons, maximum, to be shipped as nearly as possible in equal quantities and to be consigned to.....

WEIGHTS: Mine weights and mine prices shall govern all settlements, but in the event the coal is not weighed at the mine, then the first railroad weight to govern.

TERMS AND CONDITIONS: The Buyer agrees to remit in full on or before the 10th day of each month for all coal shipped during the preceding month. If credit of the Buyer shall at any time become impaired or unsatisfactory, the Seller reserves the right to require payment in advance before making further shipments. Seller will assume no responsibility for transportation or charges therefor.

The above (price or prices) shall be increased or decreased as any changes affecting present mining scale and day wages may increase or decrease the cost of producing coal during the life of this contract, also any national or state laws hereinafter enacted that may increase the cost of producing coal shall correspondingly increase above (price or prices).

This Agreement shall be subject to labor troubles, floods, fires, accidents, delays, shortage of cars, contingencies of transportation or other causes beyond the control of the party affected; neither party to be liable for failure to perform on account of these causes. Should production of available tonnage of coal herein contracted for, due to above causes, prevent the Seller from meeting all of its obligations the Buyer agrees to accept as complying with Agreement during such period, such proportion of the available coal as Buyer's orders "under contract herein" bear to such total obligations of Seller.

Noncompliance of Buyer with any of the terms of this contract will entitle Seller, at its option, at any time, to cancel this contract irrespective of failure to cancel for prior noncompliance.

IN WITNESS WHEREOF the parties to this Agreement have caused same to be executed in triplicate by their duly authorized officials.

Buyer.....

By.....

Seller.....

By.....

Large Production of Fuel Briquettes

The production of fuel briquettes in the United States in 1916 was 295,155 net tons, valued at $1,445,662, an increase compared with 1915 of 73,618 tons, or 33 per cent., in quantity, and $409,946, or 40 per cent., in value. The production in 1916 was the greatest recorded, exceeding that of 1914 by 44,520 tons.

This increase in the production of fuel briquettes in 1916 is attributed by C. E. Lesher, of the United States Geological Survey, to the improvement in trade conditions, and to a greater general appreciation of the value of briquettes for use as a household fuel.

Shall the Blind Lead the Blind?

Being an Open Letter on

The Southern Negro's Place in the Sun

[COAL AGE, in its issue of Feb. 23, spoke editorially of "The Southern Negro's Place in the Sun." Following this the letter printed below was received from a contributor who is thoroughly conversant with the character and needs of the negro. The letter speaks for itself. It can perhaps be posted to good advantage at many Southern mines.—Editor.]

To Southern Mine Managers:

EVER since your mine was opened you have been employing negro workmen and miners. They built the grades and laid the rails of the railroad that handles your product. You have learned in years of experience how to deal with the negro. You understand him and he understands you. The negro raised in the South has become accustomed to its climate and its people and has been happy and contented.

But you have not always been sufficiently regardful of the interests of your negro workman. You have let the "Fee System" in the South prey on him almost *ad libitum*. Even where some of the most obnoxious phases of the fee system have been suppressed by better laws, you cannot take to yourself as much credit for this as might and should have been your due. You have not cared as much for the health and housing of the negro as you ought. You have done very little in the way of teaching him ideas of thrift and saving. It may be that too many of you are still considering commissary profits as part of mining profits. Perhaps all of this lack of consideration for the negro is due as much as anything else to his happy and carefree disposition, which has dulled your sense of his real needs. As a result of all this, coupled with an unprecedented demand for labor, especially in the North, a problem has arisen which you must help to solve.

THE negro is leaving your section by trainloads. Urged by the lure of higher wages and a "free ride" to Northern munition and manufacturing plants, as well as certain coal fields, a veritable exodus of the negro race from the Southern agricultural and mining districts has set in. As yet you have not been as hard hit as the Southern farmer; but some of you, apparently without knowing it, are using "Boll Weevil" farmhands for rockmen, trackmen and miners, in the place of experienced negro daymen and miners, who have listened to the siren song of the labor agent who gets so much per head for delivery to the railroad, regardless of whether his charges reach their destination or get what he promised them. The Southern farmer who has seen his district denuded of negro labor, as the boll weevil marched across the South, knows what it means to have no hands to work his farm. The hands who left him also wish they were back with him. But you are seemingly ignorant of the extent of this migration, and are deluding yourselves into believing the negroes are not in earnest.

Better than any one, you know the good qualities of the negro and how to curb his bad ones. You know that an exodus of negroes Northward is a clean-cut case of the blind leading the blind. The mining business has its ethics, too. As no good woman will bribe her neighbor's cook to secure her services, so no mining concern can decently entice labor from another.

Canvass this matter with the negro workmen at your camp. You can save your colored friends a long trip and a lot of trouble. It is up to Southern managers to inform the negro of false allurements to leave his rightful place in the sun. It is up to Northern businesses to let Southern negroes stay in the place they were born and suited for.

To the Negro Workers in Southern Coal Mines:

MOST of you, thanks to the education which your white friends and employers in the South have helped to give to you and your children, can read. Before you promise the labor agent to go with him to the train which he has said will take you to the pot of gold at the end of the rainbow, take time to do two things:

First—Go and talk to your employer. Tell him the name of the labor agent and all about what he has promised you. Your superintendent and your boss is your friend. His company is paying him to look after your interests. Tell him why you thought about leaving. The chances are when you get through talking with him, you won't want to go.

Second—Read the daily and weekly papers in your town and county. They will tell you how your colored friends who have gone ahead of you are faring. You may find they are not having as good a time as was promised them. Don't let a "free ride" tempt you to lose a steady job and a good boss. You know where you always go when trouble hits you, and who has always helped you out of it.

Don't forget that a respectable negro miner is just as much respected by his white employer as a respectable white miner, and is paid just the same rate. Don't spend your money as fast as you make it. Remember, times won't always be as good as they are now. Stop drawing store checks every day and start a bank account with some of your money. Work every day you can. The busier you are the more money you will make and the less time you will have to listen to labor agents who don't care where you live or when and where you die.

The concern you are working for does not want to lose you, if you are a good worker. Talk to your boss before you consent to leave your home and place in the South. Tell your neighbor to do the same thing. Your Southern home may be humble, but you'll find there's no other place half so good.

Yours truly,

A FRIEND OF THE NEGRO.

Recovery of Benzol at Byproduct Ovens*

By F. W. Sperr, Jr.†

SYNOPSIS—Byproduct recovery plants have increased very rapidly since the beginning of the war, and a careful analysis of the situation indicates a good market even when peace is declared. Great improvement has been made in the distillation of pure benzol and toluol. Production costs of benzol vary from 4 to 7c. per gal.

One of the most noteworthy achievements in American chemical industry during the last two eventful years has been the rapid development of the recovery of benzol from coal gas, associated principally with the manufacture of byproduct coke. The lag in development was due, partly, to a seeming lack in demand for the material, partly to the abundance of petroleum, and partly, also, to the groundless fear that the operations necessary for the recovery of benzol would add too many complications to the manufacture of byproduct coke.

Rapid Increase in Byproduct Recovery Plants

At the close of 1913 there were about 16 plants in the United States making light oil from coke-oven gas. It was used for the enrichment of illuminating gas, leaving a comparatively small amount of material for other purposes. There were only two or three small plants for the manufacture of pure benzene, toluene, etc. From the close of 1914 to the summer of 1915 the prices of benzol products rose with the cessation of foreign supply and the ever-increasing necessities of the munition business, until pure benzene commanded over 80c. per gal. and toluene was sold as high as $7 per gal. The response was rapid. The first complete modern plant for the large-scale production of pure benzene and toluene was put into operation in May, 1915, and the total production of benzol products in the United States in that year rose to over 22,000,000 gal.—more than twice as much as had been produced the previous year.

At present (Jan. 1, 1917) there are about 40 benzol recovery plants in operation in connection with byproduct coke plants, having a capacity of approximately 30,000,000 tons of coal per year. Making due allowance for the facts that a number of these plants scrub only part of their gas and that part of the benzol is immediately used for enrichment, a conservative estimate would place the present annual light oil production at not less than 40,000,000 gal. Three of these plants are now being enlarged, and eight new plants are in course of construction. The completion of this new work will bring the annual production of light oil up to nearly 50,000,000 gal. The prices of benzene and toluene, although lower than the abnormal figures of two years ago, are still firm, the former at about 55c. per gal. and the latter at about $1.75 to $2.50 per gal.

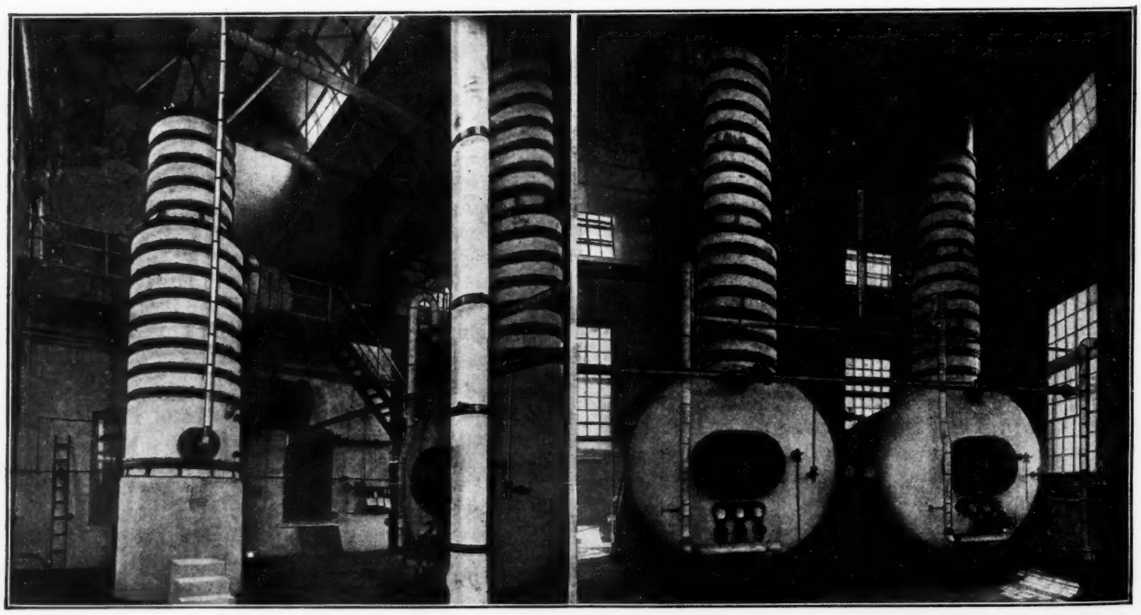
It is to be especially noted that the increase of output has been almost altogether in the production of pure products; the amount of unrefined benzol now being made is probably actually less than was made in 1914. It appears probable that at least 80 per cent. of the present production is redistilled for the preparation of pure benzene and toluene.

After-War Markets for Products

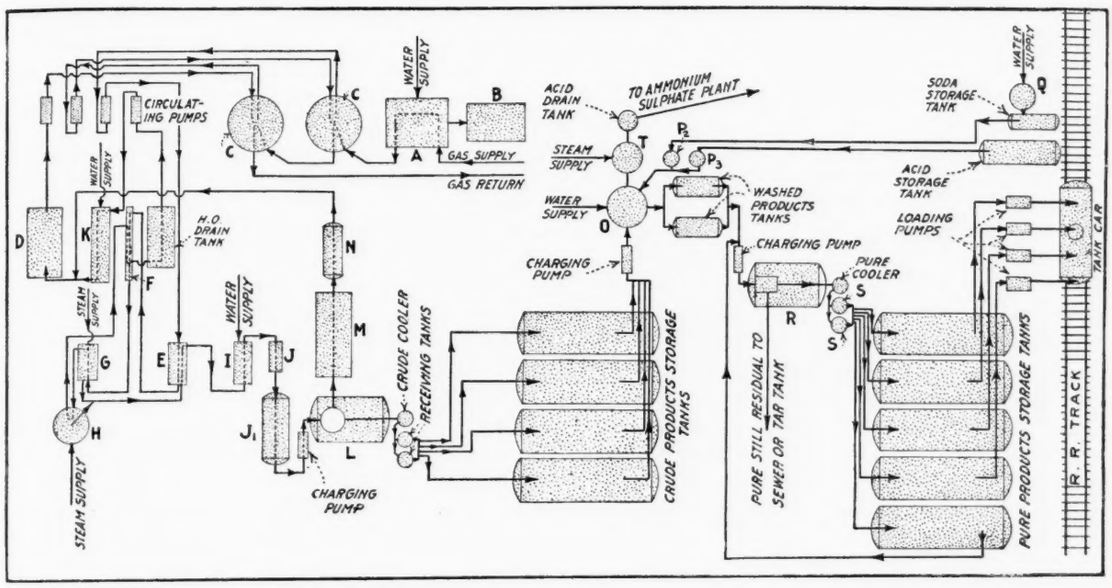
The question is frequently asked, "What will become of this vast production of benzol after the war?" It must be remembered that the use of the benzol group of explosives, particularly trinitrotoluol and tetranitroaniline, is by no means confined to military purposes, and their consumption for commercial blasting operations will doubtless increase to a very large extent, because the war

*From a paper read before the American Institute of Chemical Engineers, New York City, Jan. 12, 1917, and copyrighted by the H. Koppers Co., Pittsburgh, Penn.

†Chief chemist, H. Koppers Co., Pittsburgh, Penn.



WASH OIL AND CRUDE STILLS ON THE LEFT AND CRUDE AND PURE BENZOL STILLS ON THE RIGHT



DIAGRAMMATIC OUTLINE OF THE CHIEF FEATURES OF A BENZOL RECOVERY PLANT

has given such a convincing demonstration of their superior qualities. The demand for military explosives is likely to continue on a greater scale than before the war on account of the increased amount of military training in every country, and of the recognition of the wisdom of storing large reserve supplies of the principal explosives. It is one of the peculiar merits of trinitrotoluol that it can be stored indefinitely without deterioration. The vast development of American chemical industries insures a market for large quantities of benzol products to be used for synthetic purposes.

Its employment as motor fuel, so far as bulk is concerned, bids fair to surpass any other possible source of demand. Previous to the war, Germany used over 50 per cent. of its benzol production for the operation of internal combustion engines. J. S. Critchley, President of the British Institution of Automobile Engineers, is quoted as stating that the carburetion of benzol presents no difficulties and that in actual practice the material gives an increase of mileage of about 20 per cent. over gasoline, affording at the same time 12 to 15 per cent. more power.

The demands of the automobile industry alone are so great as to preclude the possibility of any destructive competition between benzol and gasoline. The benzol-recovery plants now in course of construction, together with those already operating, will make an annual production of about 50,000,000 gal. of benzol. There are now over 2,000,000 automobiles in operation in this country, so that the contemplated benzol production would give each machine about 25 gal. If all the coke that the country now requires were coked in byproduct ovens with benzol-recovery apparatus, we should expect a total annual benzol production of about 110,000,000 gal., or 55 gal. per machine. This total benzol production would be less than half the amount of gasoline and naphtha exported in 1915.

Other uses of benzol may be summarized rapidly for the sake of completeness. Quantities are employed in the manufacture of paints, stains, varnishes and lacquers; in the cleaning industry; in the extraction of grease and fats; as solvents for rubber and for the manufacture of artificial leather and insulating materials.

Lastly, may be mentioned one use which should be considered rather as an economic waste than of benefit to the industry. This is for enriching illuminating gas to make it conform with antiquated candlepower standards based on the use of flat flame burners. The utilization of mantle burners and the increasing tendency to replace old candlepower specifications by calorific standards, already universally adopted in more advanced European practice, will doubtless soon do away with the necessity for gas enrichment and make it possible for large illuminating-gas plants to recover their benzol and utilize it for more rational purposes. This will mean the effecting of a great additional saving.

Benzol Recovered by Distillation

Exclusive of water, the easily condensable vapors remaining in ordinary coke-oven gas after the usual process of condensation and ammonia recovery, amount to about 1 per cent. by volume of the gas. They might be removed by cooling the gas to a very low temperature, and this was actually done on a large scale in Europe some years ago; but the method was handicapped by mechanical difficulties largely due to the separation of ice and has been altogether abandoned. The only practical alternative that can be employed to recover these vapors, without altering their chemical constitution, is to treat the gas with a medium in which the vapors are soluble and from which they may be recovered by simple distillation. In the condensing plant only 5 per cent. of the total benzol in the gas is removed with the tar.

This is the principle of every benzol-recovery process in operation at the present time. It appears to have been first employed in 1859 by Vogel, who washed coal gas with fatty oils for recovering the benzol. It is peculiar that Vogel had only the idea of enriching these oils so as to improve their quality for illuminating purposes. Various processes for extracting benzol based on this principle were later patented; but it was not until 1887 that it was put into successful commercial operation. This was done in Germany by F. Brunk, who is generally acknowledged as being the founder of the modern benzol-recovery industry.

It is a peculiar circumstance that the condensable hydrocarbon vapors belong almost entirely to the aromatic series. Benzene together with its homologues, toluene and the xylenes constitutes over 85 per cent. The most important generalization that we are able to make is that the maximum yields of benzene and toluene are obtained at moderate coking temperatures. Higher temperatures have a tendency to form more benzene apparently at the expense of the toluene and extremely high temperatures decrease the yields of both benzene and toluene.

The percentages of the more important constituents of typical coke-oven light oil and the amounts usually produced per net ton of coal are given in the following table:

TABLE OF AVERAGE COMPOSITION OF COKE-OVEN LIGHT OIL

	Per Cent. in Light Oil	Gallons Per Ton of Coal
Benzene	66	1.782
Toluene	15	0.405
Xylene	8	0.216
Other substances (principally hydrocarbons)	11	0.297
Total	100	2.700

Operation of a Benzol Plant

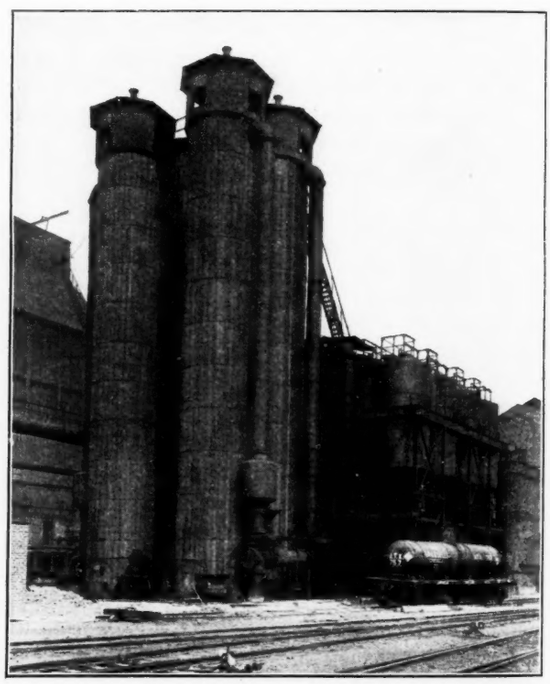
In discussing the operation of a benzol-recovery plant of modern type I shall deal principally with the Koppers patented process, because I have made a rather special study of this process as being typical of modern practice. All of the coke-oven benzol plants now under construction in America, with possibly one or two exceptions, are of this type.

In America the wash oil generally used to absorb the benzol is a petroleum product usually known as straw oil, of which at least 90 per cent. should distil between 250 and 350 deg. C. A good absorbent oil has a specific gravity of less than 0.88 at 15 deg. C., and is readily fluid at 4 deg. C. It contains no naphthalene or pitch, and exerts a good solvent action on benzol. In best practice the amount of benzol absorbed (technically the "enrichment") is kept between 2 and 3 per cent. of the absorbing oil. Too high enrichment is likely to lead to loss of benzol and too low enrichment may involve needless consumption of absorbing oil and steam. In European practice heavy tar oils are used almost exclusively as absorbing media and such materials may find increasing application in America. Such tar oils should contain less than 7 per cent. naphthalene and 90 per cent. of the material should distil between 200 and 300 deg. C.

The accompanying drawing gives a flow sheet of a benzol plant showing the principal features of operation. Previous to treatment with the absorbing oil the gas should be cooled to a suitable temperature, which may vary from plant to plant. This depends principally upon such factors as its moisture and naphthalene content, temperature of the wash oil and percentage of enrichment desired. This cooling is accomplished by means of the cooler *A*, which is preferably of the direct-contact type. The water not only acts as a cooling medium, but mechanically washes a large portion of the naphthalene out of the gas and carries it into the separating sump *B*. The cool gas then passes into the benzol washers *C*. These are tall scrubbing towers of the hurdle type, effecting a very intimate and prolonged contact between gas and oil. The debenzolized gas passes out of the last washer through the return main to its point of consumption.

The fresh wash oil is pumped from the circulating tank *D* over the scrubbers in an opposite direction to the flow of the gas, maintaining the counter-current principle that should be adopted in nearly all scrubbing operations and bringing the fresh washing medium into the scrubbing system at a point where the gas contains the least light oil vapors. The distribution of the wash oil over the tops of the scrubbers is a very important matter, and should be done as uniformly as possible.

The enriched wash oil accumulates in tanks, usually located underneath the scrubbers, and is pumped from these to the benzol-recovery plant to be heated for the purpose of releasing its benzol constituents. Part of this heating is accomplished in the Koppers system by the utilization of the heat in the hot debenzolized wash oil leaving the still. Two heat economizers are used in this system. The cold oil first enters the heat exchanger *E*, where it is heated by benzol vapors and steam from the still *H*, thence it is conducted to a second heat exchanger



GAS COOLERS AND BENZOL SCRUBBING TOWERS

F, where it receives additional heating by means of hot debenzolized wash oil leaving the still *H*. It is then still further heated to the maximum temperature desired by means of live steam in a superheater *G*, from which it passes into the still *H*.

This last still is composed of a series of superimposed sections or chambers as in common distillation practice. The heated oil flows down through these sections while steam is blown directly into the lowest section and travels in a direction opposite to that of the oil. The mixture of benzol and water vapor is partially rectified in the upper portion of the still, and then enters the heat exchanger *E*, as mentioned before, where it is condensed and the partial preheating of the enriched wash oil is effected. The remaining vapors are completely condensed and the total condensate cooled in a water-cooled condenser *I*. The light oil is separated from the water in the condensate by the separator *J*.

The debenzolized wash oil, after leaving the still, passes through the heat exchanger *F*, where it gives up a part

of its heat to the enriched wash oil, as stated above. Then it is finally cooled in the water cooler *K*. The cool oil is then delivered to the circulating tank *D*, thus completing the cycle.

The improvements that have been made in recent practice have to do principally with effecting as great economy as possible of heat in the cycle of gas treatment, distillation and cooling, through which the wash oil passes. In the Koppers system it is calculated that the devices for heat economy reduce the steam consumption in distilling the enriched wash oil by more than 80 per cent. Further economy lies in the saving of cooling water circulation which would be required to cool the debenzolized wash oil.

The light oil is accumulated in a drain tank *J*, shown in the lower part of the figure, and portions are taken for distillation in the still *L*. This still is usually known as the crude still, the first distillation of the wash oil being made for the purpose of effecting an approximate separation of several fractions of different boiling points preliminary to washing and final rectification. This and subsequent distillations are made intermittently in stills of large capacity (6000 to 12,000 gal.), which give better fractionations than are possible in smaller apparatus.

The continuous type of stills has not been found satisfactory in this work. The crude still does not require the elaborate dephlegmator that is necessary on the final rectifying stills. The heating is accomplished by means of internal steam coils and a direct steam spray. The benzol and toluol are principally distilled off by indirect heat, using the steam coils, and the higher boiling constituents, xylol, solvent naphtha, etc., are then distilled over by introducing steam directly into the still.

The Average Yields

After the benzol, toluol, xylol and solvent naphtha have distilled off, a certain amount of wash oil containing naphthalene remains in the still tank. The presence of wash oil in the light oil is due not only to mechanical trapping of the heavy oil during the distillation, but also to the actual distillation of some of its original constituents by agency of the direct steam used. The products recovered from 1000 gal. of light oil vary according to the kind of coal coked, the regulation of the ovens, and the method of operation of the light oil plant. In one plant that may be taken as fairly typical of a well-operated system, the yields average about as follows from 1000 gal. crude light oil: 680 gal. crude benzol; 140 gal. crude toluol; 50 gal. crude xylol; 55 gal. solvent-naphtha; 75 gal. wash oil residue with naphthalene.

The wash oil remaining in the still is drained into the cooling pan *M*, where it is cooled in the air to crystallize out the naphthalene. The wash oil is drained away from the latter into the tank *N*, and then is returned to the main circulating tank *D*. In large plants where the amount of naphthalene is great, a centrifugal dryer is employed for the purpose of separating the small amount of oil remaining in the naphthalene and also for reclaiming the naphthalene from the separating sump at the foot of the gas cooler. The crude naphthalene so obtained can be sold as such, or may be put into the tar in the coke plant.

The products obtained from the crude still will satisfy many commercial purposes in normal times. However, at present the demands of chemical manufacturers for benzol and toluol of a high degree of purity have made it advisable to accomplish the complete process of purification at the coke plant to serve this important part of the trade. For this purification the crude benzols are first washed with sulphuric acid and then with caustic soda and water.

This operation is accomplished in the agitator *O*, which is a large lead-lined vessel with an efficient mechanical mixing device for bringing the acid and benzol into intimate contact. The acid is commercial concentrated sulphuric acid (66 deg. Bé). The quantity used is accurately measured from the meter tank p_3. The caustic soda solution is prepared in the tank *Q* and measured in the meter tank p_2.

The acid has the effect of reacting with, and to a large extent polymerizing most of, the impurities which consist of various olefines and substances of similar character, together with certain phenoloid bodies. This results in the formation of resinous substances of very high boiling point, part of which are insoluble in the benzols and settle out with the acid in the bottom of the agitator, while part go into solution, giving the benzol a dark brown or a reddish color. The acid sludge is drawn off and treated as will be described later. The caustic soda neutralizes any traces of acid which may remain in the agitator and effect the removal of some of the phenoloid bodies.

After the soda wash the benzol has a lighter brown color, but always requires distillation. The washed benzol is delivered from the agitator to the still *R*. This still is generally of the same capacity as the crude still, but is provided with a very efficient dephlegmator. Sometimes purified products of less exact boiling points are desired. In this case the washed benzols are distilled rapidly, simply to separate the benzol from the resinous materials in solution. The products so produced are termed "purified," for example, 90 per cent. purified benzol, 50 per cent. pure benzol, etc., the nomenclature being based on the percentage in test distilling under 100 deg. C. The distillation for the preparation of pure products is conducted more slowly, the condensate being collected in the receivers *S* and tested carefully before placing in the final storage tanks.

Improvements in Practice

Great improvement has been made in recent practice in the distillation of pure benzol and toluol. In a well-designed plant the cuts are remarkably clean and the percentage of intermediate fractions small. At one benzol plant pure benzene is regularly being produced of a grade such that less than 5 per cent. distils below 80.1 deg. C. and 95 per cent. distils within 0.3 deg. C. Pure toluene also is being made, of which less than 5 per cent. distils below 110 deg. C. and 95 per cent. within 0.5 deg. C.

This extraordinary degree of purity is of great advantage to manufacturers of explosives and synthetic chemicals requiring the use of pure benzols. The ease with which these distillations can be effected, and the sharpness of the cuts obtained is very remarkable. Much of the secret of success lies in the correct design of the dephlegmator. The record of one plant shows the following average figures for the distillation of crude benzol, containing toluol:

	Per Cent.
Pure benzene	85.3
Intermediates	3.4
Pure toluene	9.8
Residue	1.3
Loss	0.2

The residue is often allowed to go to waste, but may be mixed with the coke-oven tar without doing the slightest injury.

The water and caustic soda used in the agitator are drained to the sewer. The acid sludge drained from the agitator is delivered to a boiler *T*, in which it is treated with direct steam. This effects a separation of the resinous materials in the form of a heavy carbonaceous spongy deposit. An acid of about 40 deg. Bé. is recovered and may be used on the coke plant for making ammonium sulphate. The boiler is covered during the operation of steaming and the escaping vapors are condensed in a cooler. Regarding other details, such as the arrangement of pumps, storage tanks and piping, the diagram on page 431, showing chief features of a benzol plant, is self-explanatory.

Few Men Required

The upkeep of a benzol plant costs remarkably little, and the labor required in operation is small. A complete plant handling 5000 gal. of light oil per 24 hr. is operated by five men on day turn and three men on night turn, with two chemists for control testing and three laborers on day turn only for loading shipments and for general utility purposes.

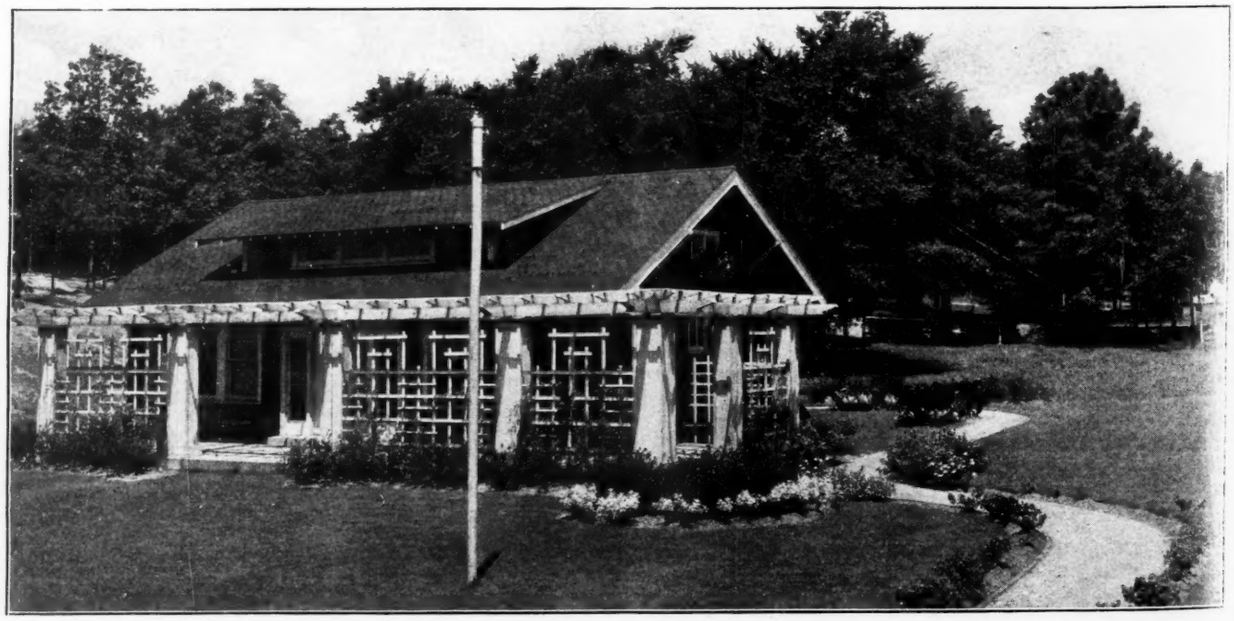
The apparatus that is subjected to the most severe conditions is the superheaters. Spare superheaters should always be provided and the apparatus arranged so as to be readily interchanged. All apparatus for heating and cooling the wash oil should be so arranged that each individual unit can be taken out easily without disturbing the other apparatus. All apparatus with the exception of that exposed to sulphuric acid is made of iron and steel, no special alloys being required. It is very essential that the utmost precaution be taken in the arrangement of the piping to obviate the possibility of accidental mixing of the different products.

Since benzol is a byproduct of coke and gas making, those items in the cost of its production which are involved also in coke and gas production are not chargeable to the benzol. In other words, the cost of making coke-oven benzol includes only the cost of its extraction from the coke-oven gas, and that of its purification. This cost in the United States will vary according to local conditions, but usually lies between 4 and 7c. per gal.

At the close of the European War, when prices again become normal, it will be possible with the large plant capacity then available to make a substantial profit from the production and sale of automobile benzol (90 per cent. purified) at prices competing with those of gasoline. There are other large uses creating a demand for the various benzols, described in earlier paragraphs, and further uses will be developed as the supply of the material becomes greater.

Loss in Calorific Value of the Gas

The effect of the removal of benzol on the calorific value of the gas has been well worked out by J. W. Shaeffer, who recently published his results in an article read before the October, 1916, meeting of the American Gas Institute. The actual loss in the calorific value of the gas amounts to about 5.8 per cent., which is a figure representing the average practice of about 30 byproduct coke plants. The figure agrees well with theoretical considerations. The result is that more debenzolized gas has to be used for accomplishing a given heating effect. Assuming that 1 ton of coal makes 11,000 cu.ft. of gas, a reduction of 5.8 per cent. is equivalent to 638 cu.ft. less gas. As boiler fuel this gas is worth about 6c. per 1000 cu.ft., so that the reduction may be figured to cost about 3.83c. per ton of coal; that is, about 8 per cent of the normal value (based on gasoline prices) of the total benzol recovered from a ton of coal.



EXTERIOR VIEW OF KINDERGARTEN OF TENNESSEE COAL, IRON AND RAILROAD CO., AT ITS EDGEWATER MINE IN ALABAMA

The Tennessee Coal, Iron and Railroad Co. is the big Southern subsidiary of the United States Steel Corporation. No company operating coal mines in the United States is doing more in the matter of improving the conditions and surroundings of employees than this large mining concern. Its accident rate is one of the lowest in the country

The Labor Situation

General Labor Review

The breaker boys who wanted a new wage scale have gone back to work, agreeing to try and secure their demands by argument instead of by a strike. Strikes of this kind are particularly annoying. A large number of grown men are laid idle for the unwarranted demands of a few youngsters.

Labor is quite scarce in the anthracite region, some people believing it fully 25 per cent. short. There is no question but every mine in the anthracite region will be able to work steadily this year. The mine workers, in making the present contract, claimed that working nine hours a day the output would be too large for the market to absorb. However, as a result of the demand for men at munitions works and as the outcome of strikes and holidays, the shorter day and a big demand for coal, the miners employed are entirely unable to supply the market demand.

On Mar. 2 a crew of 20 men employed at the Bethlehem Steel Co.'s Semet-Solvay works, Lebanon furnace, quit work because they were not granted an increase. The men, who were all classed as laborers, were being paid from 20 to 25c. an hour according to the kind of work and length of service. Working daily shifts of 12 hours, their monthly wage ranged from $70 to $100. Many by overtime made even more money. The men left because an out-of-town firm offered better wages.

Roscoe Mines Fail To Sue for Deducted Fines

The Roscoe, Penn., mine workers from whose pay $4 per head was deducted by the Pittsburgh Coal Co., in accord with the agreement, as a fine for striking in violation of their contracts, have withdrawn their suits, there being no hearing before Justice of the Peace Joe T. S. Cowen on Feb. 27, as was originally scheduled. Had Cowen made a decision contrary to the company, his records might have been brought into court on a warrant of certiorari. While his decision could not be appealed, because it was about so small a matter as $4, he could have been disciplined if the court had found that he had misconducted his office. The United Mine Workers of America worked hard to get the matter settled, and succeeded. As there were about 80 suits, about $320 was directly involved; but the amount retained by the company from its employees was about $1600.

The strike in Avonmore, Saltsburg, Leechburg and other Kiskiminetas towns of Armstrong, Indiana and Westmoreland Counties near Pittsburgh, Penn., still continues. On Feb. 26 three members of the state police arrested 34 striking miners for congregating about the Park mine of the Hicks Coal Co. and making offensive remarks to the working miners as they entered or left the mine. The company, when the action of the strikers became intolerable, sent in a request to Kittanning and Apollo for state policemen to keep order.

On the following day the strikers were accused before Justice of the Peace Lee van Gisen and held to await the action of the grand jury. The United Mine Workers of America bailed the men out, putting up $5000 as guarantee for their appearance.

A local union at Patton, in central Pennsylvania, recently purchased 100 bbl. of flour at Minneapolis. This flour will be sold to the miners at cost. The price they hope to put on it will be about $9.25 a barrel.

"Standard Weight" Strike Has Reduced Scope

On Feb. 25 the mine workers held a meeting at Portage and decided not to return to work till the standard weight was abolished. About 500 men attended the meeting. Though the union is not backing the strike, the men are fully determined not to work and are leaving for other fields, agents of companies from all over the state urging the mine workers to go to their several mines. About 200 men have already left Dunlo.

Many of the employees of the Logan Coal Co., the Yellow Run Coal Co. and the Henrietta Coal Co., in Dunlo and Lantair, have returned to work. The dispute in the case of these companies will be arbitrated.

On Mar. 20 a vote will be taken in District No. 2 for a successor to Thomas Haggerty, an international executive board member, who has just resigned. A vote will be taken to decide whether the checkweighmen shall receive from the miners the 10 per cent. bonus which the latter are now paid by the coal companies. As the Operators' Association of Central Pennsylvania has refused to attend a conference with the union men of the district, the locals will not vote for or against such a conference. The union does not intend to urge the operators to grant a reconsideration of the contract, as the latter have already declared themselves opposed to any such step.

The mine workers of central West Virginia are not likely to get any consideration of their demand for a bonus over and above that already somewhat generously granted by the Kanawha Coal Operators' Association. That body met in regular session Mar. 1 and decided not to consider the demand of the Cabin Creek mine workers. Only routine matters were disposed of.

The eastern Ohio mine workers are taking a referendum vote on the location of their proposed Miners' Temple, which will be used as headquarters for subdistrict No. 5 of district No. 6, of the United Mine Workers of America. Bellaire, Bridgeport and Martins Ferry each desire that the building be erected within their corporate limits.

Kentucky a Scene of Much Strike Trouble

The Federal Coal Co. has its operations located in the extreme southeast corner of Kentucky adjacent to Tennessee and Virginia, all the holdings being in Bell County. About 600 mine workers of this company struck Mar. 1, demanding a wage increase of 20 per cent. There has been no disorder.

This movement must not be connected with the agitation in Hopkins, Webster and Union Counties in the immediately opposing end of the state, where the union is making an attempt to increase its influence. R. J. McLaughlin, representing the West Kentucky Coal Co., the largest operator in Webster and Union Counties, denied a published report that there was a strike of mine workers in those fields.

Though there has been little open unrest in Illinois among the mine workers and though Frank Farrington at a recent banquet in St. Louis declared that the miners had a contract and would live up to it till Apr. 1, 1918, there is much quiet objection to working under the unmodified terms of the present contract.

The mine workers argue that just as the Welsh miners regarded the change in conditions as being an excuse for demanding a new contract, so the miners in the United States would be justified in demanding that a new and unforeseen condition be met with an adjustment.

The Lincoln Mining Co., of Lincoln, Logan County, in the heart of Illinois, which operates a shaft operation, has a strike on hand, the 14 topmen having quit for a $2.75 per day wage—the present rate being in accordance with the scale, $2.36 per day. About 200 men are idle.

Slogan of Kansas Miners "No Beer No Coal"

The mine workers of southeastern Kansas, most of whom are foreigners, are going on strike with the slogan: "No beer, no coal." They do not like the recently passed "bone-dry" prohibition law. At last reports only at one mine had a strike taken place, but a meeting was held on Mar. 4 to discuss what the mine workers regard as a restriction on their liberties.

A new contract embracing wage scale, length of working day and working conditions was signed last week at Fort Worth, Tex., by a joint committee representing the coal miners and the coal operators of the state. There was no discussion of the points covered in the contract, since they were settled at a conference many months ago, which terminated a strike of the coal miners after it had lasted several months. The meeting at Fort Worth was purely formal and was for the purpose of signing the agreement that had already been formulated. The new contract covers a period of nearly two years and affects about 2600 Texas miners.

John Wilkinson, president of the United Mine Workers for the Southwestern District, represented the miners and presided at the conference. Coal operators who were present and signed the agreement were: W. K. Gordon, Thurber; Homer Gower, Thurber; G. H. McClure, Strawn; W. H. Jones, Bridgeport; W. F. Nance, Newcastle.

On Apr. 2 the mine workers will celebrate the introduction of the 8-hour working day. The right day for that celebration comes this year on a Sunday, and this causes a shift in the observance of the day.

Power Department

Substations for Coal Mines

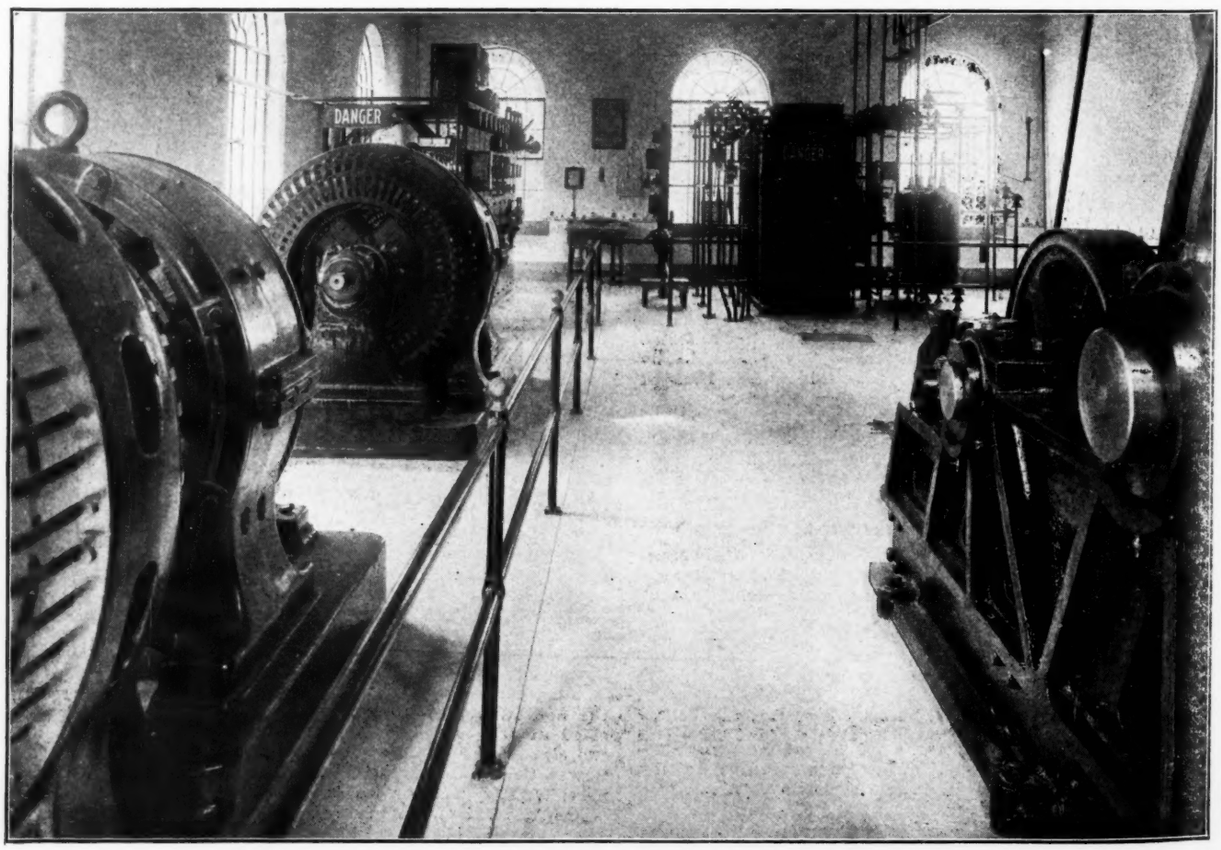
SYNOPSIS—Purchased power for coal-mining plants offers certain advantages over power generated at the mine. Since electrical energy transmitted over any considerable distance is usually alternating current at high voltage, it is necessary to convert this to direct current for mine use. This may be accomplished by means of either transformers and a rotary converter or by a motor-generator set with or without transformers.

If it is conceded that electric power affords the best means for the successful operation of a coal mine, the question naturally arises, Shall the power be generated at the mine or purchased from a central station? As mine operators are becoming better acquainted with purchased energy and since the central-station companies are extending their distribution systems and offering particularly attractive rates for this class of service, the use of purchased power is rapidly increasing.

In many instances, electricity can be sold for less than it would cost to generate it at the mine. Since reliability is the first requisite, because of the unskilled help frequently found about a mine, this can be obtained only by means of the simplest apparatus. Boilers and engines are of the simplest type, and the buildings are often of an inexpensive construction and have inadequate illumination. Consequently, the equipment does not receive the care it should.

Some of the advantages of buying power are readily apparent. The worry and care occasioned by the power plant is removed. The legitimate business of a coal operator is to mine and ship coal, and with purchased power the expense and labor saved may be devoted to this purpose. Better production may be secured, because of the reliable service of the central station. Power in any quantity will be available at all times and, consequently, increased output can be obtained quickly with but a small increase of capital. Furthermore, in case it is necessary to shut down the mine, much less expense is involved; and the outlay which would otherwise be needed for overhauling the power plant can be used for extensions.

For economical reasons, central-station power is generally distributed at a voltage much higher than that required for operating mining machinery. Since the operating conditions at the average mine are such that direct current is preferable, particularly where mine locomotives are used, means must be provided for step-



WESTINGHOUSE MOTOR-GENERATOR SETS IN SUBSTATION AT WYOMING, PENN.

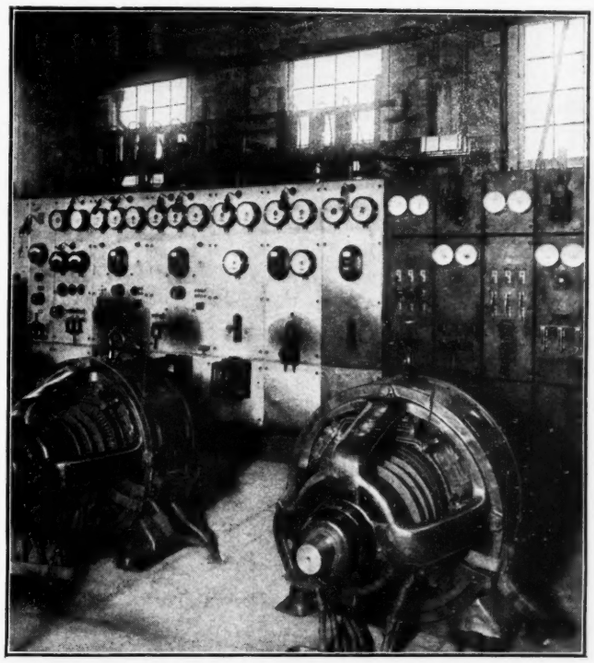
ging the voltage down to the proper value and changing the alternating to direct current. This necessitates the installation of a substation at the mine.

Mine substations consist, in general, of one or more motor-generator sets or of synchronous converters together with the necessary transformers to convert the high-voltage alternating current furnished to direct current of proper potential. An essential part of the equipment consists of a switchboard, upon which are mounted instruments for measuring the input and output of the converting and transforming apparatus, also circuit breakers and switches for controlling their operation.

Substations, when properly designed and installed, require little attention, and an attendant is needed only to reset circuit breakers and to see that everything is operating satisfactorily. In general, unless absolutely necessary to install the substation underground, it should be placed on the surface. The preferable location is at the pit mouth. It can then be attended by a workman to whom other and additional duties are delegated. In a small mine the tipple foreman can attend to the substation, while in a shaft mine the necessary machinery can be located in the hoistroom, under the eye of the hoisting engineer.

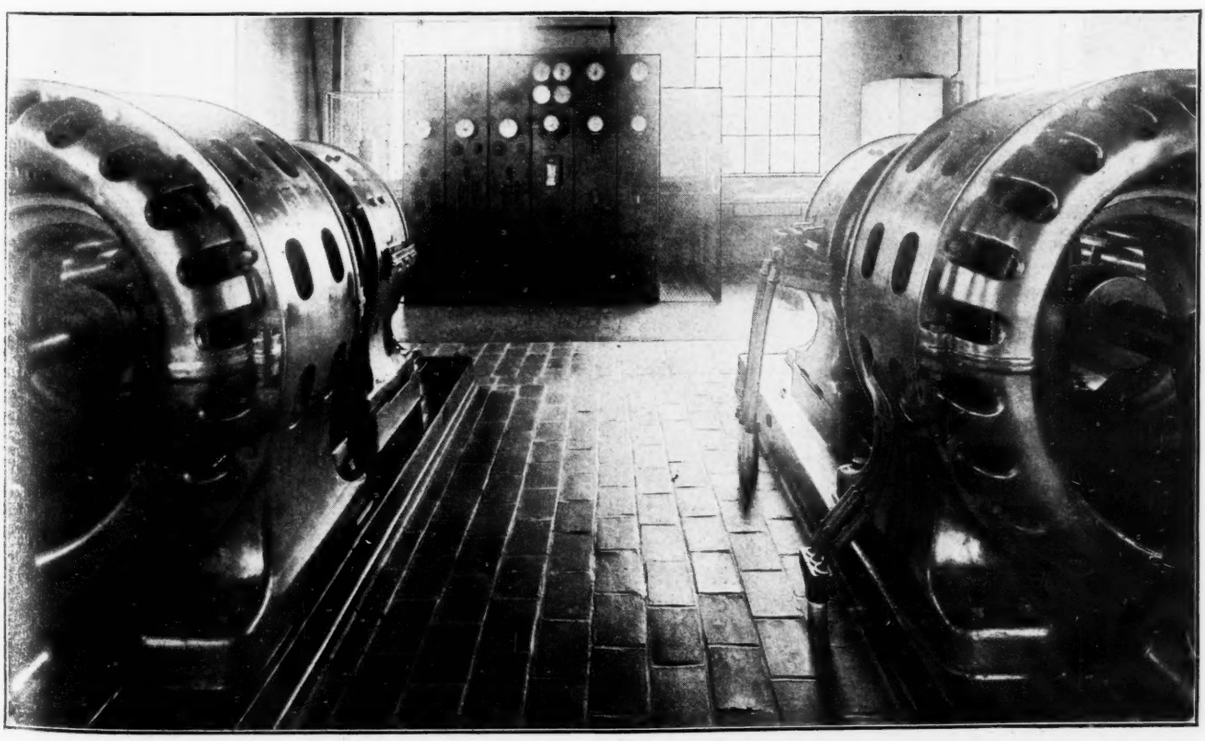
The alternating current furnished can be converted to direct current of suitable voltage either by motor-generator sets or by synchronous converters. While both are suitable, each in a way has its special field of application. The synchronous converter, from the standpoint of economy, is usually considered superior to the motor-generator set. Furthermore, the method of distributing the direct current plays an important part in the selection of the apparatus to be employed.

In a small mine, particularly in the case of a bituminous as distinguished from an anthracite operation, the electric power is carried through a single opening



SYNCHRONOUS CONVERTERS AND SWITCHBOARD AT STONEBORO, PENN.

which is termed the main entry. This power is generally required at some distance from this passageway, often in the neighborhood of a mile or so. In order, therefore, to maintain a fairly constant voltage at the point of application, it is necessary that the potential at the substation shall rise as the load increases. It is for this reason that the motor-generator set is undoubtedly more popular in mining work than the rotary converter, particularly in the case of a bituminous mine



SYNCHRONOUS WESTINGHOUSE MOTOR-GENERATOR SETS AT PITTSTON, PENN.

where large areas are rapidly worked out, due to the thinness of the coal.

Where the advantage of being able to secure a rising voltage according to increase of load is not important, as for instance where several openings are served from one substation, in which case a uniform potential is desired, the synchronous converter is frequently used on account of its greater economy and the smaller amount of space necessary for its installation. Until the recent perfection of a special type of synchronous converter for mine substations, the motor-generator set was also favored for this class of service because it required less attention. Now that a rugged and reliable converter can be secured, this point is relatively unimportant.

A comparison in prices between the synchronous converter and the motor-generator set will show that the cost is practically the same when transformers are not required by the motor-generator set. Often it is not necessary to install transformers in connection with motor generators, as central stations frequently furnish power at 2200 volts, and the motor of the set can be designed for this pressure. In smaller sizes, the synchronous converter with its transformers will cost a little more than the motor-generator set, while with the larger machines the reverse is true. For the sizes most common in mine work, the cost is about the same in either case.

Who's Who In Coal Mining

Henry Phillips

One of the important coal operators of the Middle West is Henry Phillips, of Ottumwa, Iowa. It was 'way back in 1879 that the Iowa coal seams and Mr. Phillips first became acquainted, and there hasn't been any break in that close relationship right up to the present moment.

Mr. Phillips comes of old New England stock, being a descendant of Wendall Phillips and John Phillips, who was mayor of Boston in 1823. He was born in 1858 and received only a high school and business-college education.

In the cold months of each year, when the wintry winds are blowing, Mr. Phillips slips his leash and migrates to Natchez, Miss., where he owns two large plantations, aggregating 14,000 acres.

Being of a mechanical turn of mind and noting the need in his coal operations of a practical mechanical loader for getting the coal into box-cars, he invented a machine that soon came into common use at mines in all parts of the United States. He has continued to manufacture this loader at his plant in Ottumwa ever since.

There are few men who have done more with limited opportunities than Henry Phillips. He started as a teamster, hauling coal from mine to consumer, and from this modest beginning, without the least financial backing, he has raised himself to his present position of affluence and importance.

Even a brief biography of any man isn't complete today unless the writer of the story enumerates the hobbies of the individual whose life he is sketching. They say out West that Mr. Phillips is pretty much a one-track fellow, and such men don't have many hobbies; but Mr. Phillips has one—poetry. Yes, sir, he writes verse; in fact, he has published a book of poems entitled "Pleasant Thoughts and Memories." These artistic efforts, however, were "just for fun" and there was no serious thought of stealing laurels from Kipling, Braley or Service.

HENRY PHILLIPS
Coal operator and manufacturer of Ottumwa, Iowa

In his business life he is president of the Phillips Coal Co., the Ottumwa Box Car Loader Co. and the Black Diamond Store Co., and secretary of the Ottumwa Mill Construction Co. The fellow who first mentioned "self-made" was thinking of Mr. Phillips when he coined the phrase.

Gas, Oil and Ammonia in Cannel

The United States Geological Survey has made investigations as to the gas, oil and ammonia found in the cannel coal from five mines in central Pennsylvania. The figures, which are given below, have been reduced to gallons or pounds per short ton of coal.

Source of Cannel	Oil, Gal.	Water, Gal.	Gas, Cu. Ft.	Ammonia, Lb.
Altoona mine, Indiana County	20.3	7.7	4,790	5.57
Bostonia Mine, Armstrong County	33.6	7.0	5,029	5.37
Pine Run No. 1, Armstrong County	25.2	9.8	5,029	5.06
Pine Run No. 3, Armstrong County	31.5	8.4	4,311	3.68
Cannelton, Beaver County	37.3	10.5	5,268	2.24

Briquettes Adapted for Storage and Transportation—Briquetting was first practiced in Europe as a means of burning the "smalls" produced in mining and handling coal. When the advantages of this form of fuel for storage and shipping purposes became known, the briquettes sold at a premium. This is particularly true of the best grades of bituminous fuels, notably the Welsh Admiralty coal.—C. T. Malcolmson.

Editorials

Some Difficulties in the Coal Situation

Steam consumers are bitterly denouncing the coal men because of the extraordinary prices now prevailing, and it must be conceded that never before in the history of the industry has there been such a sustained period of extraordinarily high prices as has marked the season now drawing to a close. But, on the other hand, it must be remembered that these prices apply to a relatively small percentage of the business negotiated, by far the largest proportion of the production moving on moderate-priced contracts. And even where extra profits have been realized, it is not likely that the consuming interests would resent these so aggressively were they familiar with all the difficulties the operators are having. As an example, the annual report of the Lehigh Coal and Navigation Co. for the year ended Jan. 1, remarks rather plaintively in the opening paragraphs:

> Unusual difficulties occurred in the operation of anthracite collieries, due to the higher cost and the unrest of labor, as well as to the largely increased cost of supplies of all kinds combined with a resulting decrease in daily capacity. These circumstances, . . . together with the congested transportation facilities in certain sections, required the continuous and patient efforts of the operating officials—harassed as they were by investigations, both state and Federal.

Perhaps never before has there been such a complete breakdown in railroad service, particularly since the intensified submarine campaign has limited ocean shipping, choking up the yards at seaboard and backing up freight far into the interior. In addition, the roads are short of men, while expenditures on motive power, maintenance of roadbeds, enlargement of terminal facilities, etc., have admittedly failed to keep pace with the expansion in their business. And with the increased demand incident to the beginning of Lake navigation there is little hope for improvement in this direction.

Of more vital interest to the coal industry is the arbitrary action some roads are taking to force operators to furnish them with coal by threatening to withhold cars. Rumors of such incidents in different sections of the country have ceased to be rumors and have crystallized into realities. The operator in question is served with an ultimatum that no cars can be furnished except for loading railroad coal. This in itself would not be objectionable were the roads willing to meet the prevailing market figures, instead of which they are paying only nominal prices for such coal; there are even instances where operators have taken this business at less than the cost of production in the effort to furnish their men with work and keep their organizations intact.

The labor problem has attained to acute proportions, due to the irregular working schedules at the mines and to very attractive offers from other lines of industry. So short has the working time been in some sections that operators have in some instances been compelled to arrange special credits at the stores for the miners and sometimes reduce prices to actual cost. In addition to this, reports of voluntary advances in wage scales are now becoming almost of daily occurrence, not to mention occasional extra inducements in the shape of decreased working hours.

Export shippers have been contending with the most spectacular advance in vessel rates in the history of shipping circles. Vessels of all descriptions are in the greatest demand and exporters have lost incalculable business, due to their inability to secure transportation.

In the retail trade it is doubtful if the dealers and wholesalers ever put in a more trying season. Consumption has expanded appreciably, due to the fact that money has never been freer and also to the almost continuous cold weather; as an example of this latter a New England textile mill that ordinarily consumes 835 tons a month recently used 410 tons in a single week, while greenhouse men in that section assert that they have never been able to bank their fires a single night since last November. Retailers' stocks have been practically exhausted time and again, and the most aggressive actions have been resorted to in order to replenish them. Recriminations of the bitterest kind have frequently been exchanged between dealers and their customers, as well as dealers and the agencies of the big companies, and the latter have been very hard pressed to explain the falling off in shipments to certain sections.

If any of the coal men have indeed made extra profits, they have probably, with rare exceptions, more than earned them.

West Virginia Operators Indicted

The Federal Grand Jury in New York City returned on Tuesday, Mar. 6, two indictments against 64 coal operators and 108 coal companies for having, during the past three years, been engaged in a combination in restraint of interstate trade and foreign commerce in violation of the Sherman Antitrust law. These operators are located in the Pocahontas and New River regions.

The Government alleges that the operators sell about 22,000,000 tons of coal per annum which, before the forming of the alleged combination, would have been sold for $27,500,000 and at that price yielded a profit. With the contract price at $3, the companies would be receiving $66,000,000.

So long as the matter is before the courts, it is not permissible to say anything as to the guilt or innocence of the parties. It is to be hoped that it can be proved that whatever association existed was well within the law. That prices are raised is not a sign of a combine.

There are state Granges and national Granges to better the condition of the farmer. These institutions can hardly be charged with being the cause of the outrageous prices for potatoes, eggs, onions, chickens and butter. When a hundred retailers clamor for the product of one producer, he raises his prices. How far, morally, he is justified in so

doing, is a question; but certainly such an increase is not a violation of the Sherman Antitrust law.

We believe coal prices in the bituminous regions have been too high, but not because there has been any trust. In the anthracite region there has been a close adherence of the larger companies, and the result of this so-called trust has been to keep prices at a reasonable figure.

It is much to be regretted that the organizations of bituminous operators have not seen fit to use their powers to secure a similar end. They have threatened their existence by permitting runaway markets. However, they cannot be convicted for what they have failed to do. They can only be penalized if it is proved that they have undertaken to raise prices or to combine for that purpose. It is to be hoped that the present undue increase in price cannot be traced to their alleged organization.

As for a combination against Great Britain, Italy, France and Spain, it is ludicrous to regard that as a fault. When did those countries ever fail to conspire against foreign trade? And have not we, by advice of the President, been urged to make legal the right so to conspire that we may enter foreign markets on even terms? It is time for us to incarcerate our citizens when the people of foreign countries make protest and show a disposition to spare the pocketbooks of United States citizens by similar restriction on cartels for foreign trade.

Great Britain Withholds Export Statistics

One of the most drastic actions of the British censor, so far as concerns the coal industry, is the announcement that the regular monthly statement of British exports will be discontinued for the time being.

Owing to Great Britain's dominating position in the world's coal market, this detailed statement has always formed one of the best barometers of conditions in that market that has been available.

It is perhaps to be wondered at that the publication of these figures has been permitted as long as this, while, at the same time, it is to be regretted that this index of the foreign coal market will no longer be available.

Eastern Coals Losing Their Middle Western Markets

During the past several months, the extreme shortage of Pocahontas and New River coals for heating purposes in downtown office buildings, flats and residences, in Chicago, has caused a drift toward the use of high-grade Western fuels. Many users have substituted southern Illinois egg with good results, and it is expected that if Eastern smokeless coals continue to be quoted at a high range of prices, there will be an increased substitution of Western prepared sizes from the southern Illinois and Kentucky fields. Some plants will have to be changed in order to burn Western coals economically and without excessive smoke, while in other instances it will only require that those using the coal be educated in the matter of proper firing to effect the change.

The anthracite companies, too, may find the going harder in the Middle Western market in the future. Owing to the high prices of Eastern anthracite, the Arkansas semi-anthracite operators have been able to establish a rate of $3.10 per ton on their contracts for Huntington (Ark.) hard coal at Chicago. This is the most prominent semi-anthracite producing district in Arkansas, and this coal may be a considerable factor in the Chicago market and other Western distributing centers. It has already been extensively used in Western and Northwestern territory in competition with dock anthracite.

The Anthracite Freight-Rate Reduction

The proposed compromise concerning the ruling of the Public Service Commission of Pennsylvania, ordering a reduction in the freight rates on anthracite coal, covers only shipments within that state, but it will also be of interest to all consumers of anthracite. If the rates are to be considerably reduced within the confines of that state, there must inevitably be some readjustment of the disproportionate rates, say, for instance, to New Jersey points, which are reached merely by the crossing of a river.

It will be recalled that the original order of the commission called for a reduction of approximately 40c. a ton on all sizes of coal, to become effective Dec. 1, 1914. The railroads bitterly opposed the action of the commission and appealed to the courts, filing a bond of $800,000 guaranteeing a refund if the ruling should be upheld. On the basis of the 40c. reduction this refund would now amount to about $8,000,000, and it is problematical whether the roads could be compelled to make up the difference.

Under the compromise as now suggested the reduction would be 25c. on prepared sizes, 15c. on pea and 10c. on the steam sizes; and there is apparently nothing said of the refund at all. Even the newspapers, which are usually most alert in such matters, have apparently overlooked this. It is hardly conceivable that the attorneys for the state intend to forego this refund as a part of the new agreement.

It was intended that the new rates should become effective Apr. 1 next, but the proceedings have been delayed because several of the retail dealers have announced that they intend to absorb the reduction themselves, inasmuch as their business is now conducted at an inadequate profit, as shown by the recent report of the Anthracite Coal Commission. Steps are now being taken to compel the retailers to give the benefit of the new rates to the consumer.

This promises to be a most difficult problem, as it would be necessary to ascertain what the retail price of every dealer is on the day before the reduction became effective. As is well known, there is no standard retail price. Therefore it would be necessary to see that these prices are lowered 25c. the day the ruling became effective and kept there the next, and the next, *ad inf.* In the meantime, something might happen to compel the retailer to increase his prices.

In the face of the circumstances attending the order reducing the rates, it seems likely that the proposed compromise rates are still too high. In the testimony before the Public Service Commission it was proved that the cost of transporting a ton of coal to Philadelphia was 55c. When this figure is compared with the existing freight rates of $1.70 on prepared coal, $1.40 on pea and $1.25 on smaller sizes, the gross profits of the railroads is still out of all proportion. There seems to be no reason for not holding the railroads to the original reduction

of 40c., even if it should take a year or more to settle the matter. Possibly the railroads are convinced of the legality of the ruling, or they would not show a disposition to assent to a compromise reduction.

If the decision is upheld, as it appears from the evidence at hand it will be, the dealers would have the opportunity of placing their business on a profitable basis and still be able to share "fifty-fifty" with the public. It will no doubt be said by some that the dealers would absorb the 40c. just as readily as 25c. On the other hand, an increase of 20c. will give the retail man a fair profit, and any more than that would open the way to active competition with other dealers in a way that prices would so adjust themselves to a level wherein the public would actually benefit.

Acute Coal Shortage in New England

The steam-coal situation in New England continues acute. Pocahontas and New River in cargo lots are an easy sale up to $12 alongside, and $14 to $15 continues to be the spot price for small lots on cars for quick delivery. Some distributors are holding the good grades for contract business and for the spot demand will only sell what inferior coals they have been able to pick up.

The volume of spot coal available at the distributing points is very small and consumers inland are obliged for the most part to turn to all-rail delivery for their emergency supplies. Car supply is also much restricted for short hauls. Portland continues to feel the shortage more than either Boston or Providence. Points like Bangor that are ice-embargoed are heavily handicapped in getting coal. Dealers and consumers were not able to get their accustomed quota last fall and are therefore forced to draw on Portland earlier than usual. To add to the difficulties, traffic restrictions are enforced against reconsignments at various New England points.

A blocking snowstorm early this week caused further delays. Marine transportation has moved very slowly for nearly a month now. All concerned are looking hopefully toward spring, but it is conceded that conditions will show very little improvement for some time to come.

Spot quotations are strong at $7 f.o.b. Norfolk and Newport News, Va. Even the smaller agencies are without much coal to offer; the amount sold is therefore confined to smaller lots than was the case a fortnight ago. The small shippers are now aware that the pier situation warrants their holding coal until it is actually "spot" and are accordingly less inclined to sell for delivery a week in advance.

The Remarkable Strength of the Anthracite Market

The present strength of the anthracite market is well indicated by the lack of excitement as a result of the railroads' offer to compromise the long-standing controversy over the reduction of freight rates in Pennsylvania. The shippers report that no orders have been canceled on account of this, even though it is proposed to make a reduction of 25c. on prepared sizes, 15c. on pea and 10c. on smaller sizes, effective within a month. Ordinarily, March is one of the dullest months in the year. Most individuals commence shipping at April circular, and some of the companies have even been known to do this. The fact that premium coal is being sold at this time is in itself remarkable, and more especially so as the prospect of a freight reduction would in other years have completely demoralized the market and probably made it necessary to shut down the collieries.

For the first time in years, there is no anxiety about having too much full-priced coal on hand at the end of March. No authentic information is yet available as to the April circular, but the feeling is growing that no reduction will be made. Many rumors are current as to new prices, one of the most persistent being that the present prices for prepared sizes will be advanced 10c. per ton monthly until August, inclusive, thus making the winter schedule: Egg $4.65, stove $4.90, chestnut $5, at the mines. In contrast with this one of the largest Philadelphia buyers of family coal is of the opinion that the present circular on these sizes will remain effective throughout the year, with a very substantial increase on pea coal and the steam sizes.

The big companies are considering the subject carefully, but we doubt if they have by any means determined upon the new circular; and if any change is made, it will probably not be announced until almost the very last day. Furthermore, if the demand for coal continues throughout March, it would not be at all surprising to see the entire matter drift along through April, with a change being made on May 1. On account of the labor difficulties that was the month in which the change was made last year, and was found to be most satisfactory to the retail men, as April is always a fairly good month. On top of all this one of the big individual shippers has announced that he will not reduce prices on Apr. 1, though this may have been done with the intention of influencing the action of others.

Whatever happens, the retailers are not particularly disturbed, because they are a unit in believing they are certain of a busy summer regardless of prices. After the experiences of this season, they claim it will be an easy matter to induce their customers to store coal when they can get it. There can be no doubt that storage coal alone prevented a panic the last few months, and if the companies will be too busy to store during the coming summer, as is so freely predicted, fuel will be scarcer and higher than ever before. Indeed, this is a question that is being given anxious thought by many in the trade.

Conditions at the Upper Lake Ports

Most of the tonnage left on the docks is still to be delivered under contracts, and Lake ports will be bare of stocks by the middle of March if contract obligations are fulfilled. Unduly heavy ice conditions at nearly all Lake ports suggest that the opening of navigation may be very late this season. No contracts have been reported recently for vessel tonnage, and rates for the ensuing season cannot yet be determined. Prices for all grades of coal at Northwestern points show a tendency to advance rapidly.

Duluth and Superior have about 65,000 tons of anthracite and 1,000,000 tons of bituminous on hand. It is estimated that the increased consumption of coal in the Northwestern States this season is 20 per cent. over other years, as compared with a normal increase of approximately 10 per cent. Railroads use 40 per cent. of the coal shipped into the Northwestern States. Industrial demands are increasing rapidly and are fully 10 per cent. of the total.

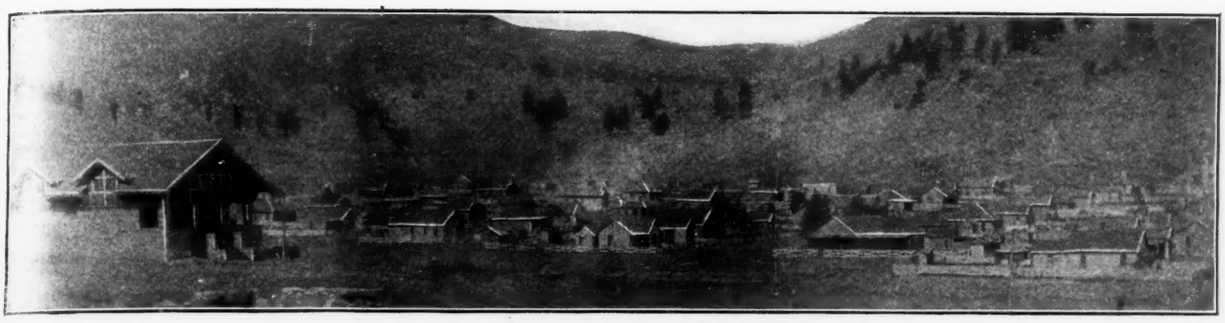
Colorado Fuel and Iron Co.'s Social Activities

Courtesy of "C. F. &. I. Co. Bulletin"

WELL-TRAINED NURSING STAFF AT MINNEQUA HOSPITAL, NEAR PUEBLO, WITH HOSPITAL IN REAR

Courtesy of R. W. Corwin, Chief Surgeon

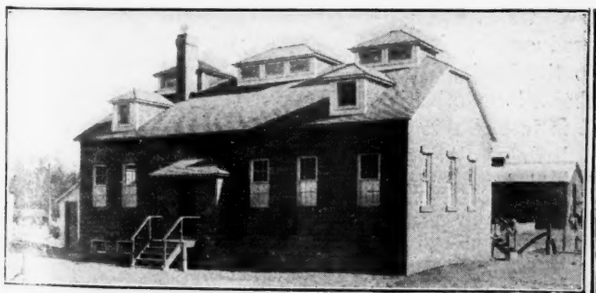
VIEWS SHOWING COMPLETENESS OF EQUIPMENT IN ALL DEPARTMENTS, BOTH SERVICE AND RESEARCH



COLORADO FUEL AND IRON CO.'S CAMP AT TERCIO, COLO.

Courtesy of "C. F. &. I. Co. Bulletin"

GIRLS OF THE DOMESTIC SCIENCE CLASS OF THE SOPRIS SCHOOL WEARING DRESSES THEY MADE THEMSELVES



Courtesy of "C. F. &. I. Co. Bulletin"

BATHHOUSE AT ROUSE MINING VILLAGE

Courtesy of "C. F. &. I. Co. Bulletin"

THE FUEL COMPANY HAS AN ANNUAL FIELD DAY IN TRINIDAD, AT WHICH GORGEOUS FLOATS PROCLAIM THE PRIDE OF THE VILLAGES. THE FLOWERS IN THE BASKET ARE THE CHOICEST FROM THE SOPRIS HOMES

Discussion by Readers

Schedule in Motor Haulage

Letter No. 2—I was much interested in reading the description of a motor schedule, in mine haulage, by Ostel Bullock, *Coal Age*, Jan. 27, p. 201. The mine, in that case, was equipped with telephones, which made it possible to communicate with the motormen in different parts of the mine and direct the movement of all trips from a central station.

The adoption of a time schedule, in haulage, is of even greater importance than is generally realized, because it informs the mine foreman, superintendent and manager of things going on in the mine. It shows where any delay occurs, the cause of which can be investigated at once.

There are a number of mines, however, where there are no inside telephones and where the usual practice is for the motorman to run his motor between the shaft or slope bottom and the inside partings on his own time. In such a mine, he may be delayed by a derailed car or other unavoidable cause, or he may stop to chat a while and be in no hurry to pull the coal to the bottom; and the foreman, who inquires as to the cause of the delay, is seldom able to get the real facts.

Systematizing Underground Haulage

The general manager of a mine where I worked, being desirous of systematizing the work and ascertaining for himself the actual conditions underground, employed a boy who was stationed on the mine bottom, and given a watch, book and pencil, with instructions to note down in the book the time of the arrival and departure of the main-line motor, together with the number of cars hauled and the section or parting from which they came. The boy also looked after the coupling and switching of the cars, it being his duty to see that everything was clear for the next trip of the motor. In reality, this boy was flagman, switchman, trapper and tallyboy. As a result, things began to run more smoothly, and there was seldom any delay.

This mine had a capacity of 1200 tons a day. The main-line motor was an 8-ton Jeffrey locomotive and hauled from six partings inside of the mine. The first parting was 700 ft. and the last, or inside parting, 3000 ft. from the shaft bottom. Each parting held from 15 to 30 cars having a capacity of 1½ tons each. Mules were used to gather the coal on five of the partings, while a 4-ton Ironton storage-battery locomotive was used to haul the coal to the sixth parting.

For the benefit of the mine foreman, there was a small blackboard, 2 x 3 ft. in size, at each parting. These boards were made of inch-pine and covered with three or four coats of black paint. The drivers and motormen marked on the boards, with chalk, every car they hauled, each driver keeping a separate record.

Every night the switchboy handed his book to the foreman, and he turned it over to the superintendent, who made out a daily report on a blank form prepared for that purpose. This report showed the number of cars hauled from each parting or section of the mine, besides the number of loaders, machinemen, helpers and daymen. The superintendent kept a carbon copy of his report, but sent the original to the general manager, who was thus kept informed of the work done underground and the cost of every operation.

A single trial of such a system, in the operation of a mine, will convince anyone of its value as a money saver. It shows the weak points in the system and informs the general manager of the needs underground in a way that it would be difficult for a foreman to impress on his mind. When the weak points of a system are thus made known, the trouble can be remedied quickly.

G. W. Sutherland.

Blakeley, W. Va.

Drawbar Pull vs. Track Resistance

Letter No. 1—Kindly permit me to remark on the editorial reply to an inquiry relating to the drawbar pull of a mine locomotive, *Coal Age*, Feb. 17, p. 331.

The answer given to this inquiry is very clear and concise, except that the last paragraph appears to take no account of the loss in drawbar pull of a locomotive when operating on a grade. With cast-iron wheels, a locomotive operating on a straight level track will have a running drawbar pull, as stated, approximately one-fifth of the weight of the machine.

When running on a grade, however, it is evident that the locomotive must exert less drawbar pull than on a level track, owing to the effect of gravity, which is to produce what is sometimes called the "gravity pull," due to the inclination of the track. Suppose, for example, that a locomotive is moving up a very heavy grade where it is just able to maintain itself or overcome the gravity pull due to its own weight. It is clear that if any load is added at the drawbar, it will cause the locomotive to slip back down the grade.

Need To Consider the Total Moving Load

Now, referring to the last paragraph on page 331, where it is "required to find the maximum load a 6-ton mine locomotive will haul up a 2½ per cent. grade, assuming a track resistance of 30 lb. per ton," it is true that the total track resistance in this case is the sum of the grade resistance ($2\frac{1}{2} \times 20 = 50$ lb. per ton of moving load), plus the track resistance (30 lb. per ton of moving load), making the total resistance to motion up the grade 80 lb. per ton of moving load.

The moving load includes both the locomotive and the trip hauled. In that case, it is clearly wrong to estimate the maximum load that the locomotive will haul, by assuming that the drawbar pull is equal to one-fifth of the weight on the drivers, which is only true for a level track. Allow me to suggest that the simplest approximation for estimating drawbar pull on a grade is on a percentage basis, as follows:

A locomotive has an internal frictional resistance of practically 20 lb. per ton, or 1 per cent. of its weight. Then, assuming that the drawbar pull is about 20 per cent. of the same weight makes the tractive effort at the wheels approximately 21 per cent. of that weight (weight resting on drivers). But when the locomotive is operating on a grade the drawbar pull is equal to the tractive effort (21 per cent.) less 1 per cent. frictional resistance and 1 per cent. for each per cent. of grade.

In the case assumed, the grade being 2½ per cent., the total percentage of resistance to be deducted from the percentage of tractive effort is $1 + 2\frac{1}{2} = 3\frac{1}{2}$ per cent., which makes the percentage of drawbar pull $21 - 3\frac{1}{2} = 17\frac{1}{2}$ per cent. of the weight of the locomotive resting on the drivers.

Then, for a 6-ton locomotive operating on a 2½ per cent. grade, the drawbar pull is, approximately, $0.175(6 \times 2000) = 2100$ lb., which is the available drawbar pull, in this case, instead of the estimated 2400 lb. The total trailing load or trip hauled, in that case, would be $2100 \div 80 = 26\frac{1}{4}$ tons, instead of the estimated 30 tons.

A method for determining the weight of locomotive required for a given haul was explained in detail in my article published in *Coal Age*, Vol. 7, p. 407.

GRAHAM BRIGHT, Electrical Engineer,
Westinghouse Electric and Manufacturing Co.
East Pittsburgh, Penn.

Working 3-Ft. Pitching Coal

Letter No. 5—In reading the article by Samuel Dean, *Coal Age*, Feb. 10, p. 260, I notice that he says that "face conveyors have not always been a success abroad." I recall an instance in my own experience where the installation of a face conveyor in a mine in the old country was a failure.

This mine had been in operation about 35 years, and the workings extended underground some 3 miles from the foot of the shaft, which was 1100 ft. deep. There were three seams of coal, which were dry and gaseous.

The seam in which the conveyor was installed was only 2½ ft. in thickness. The expense for brushing the roads in working this seam had been so great that it was decided to investigate the question of putting in a conveyor at the working face. The result was the adoption of a "Blackett chain conveyor" operated by compressed air.

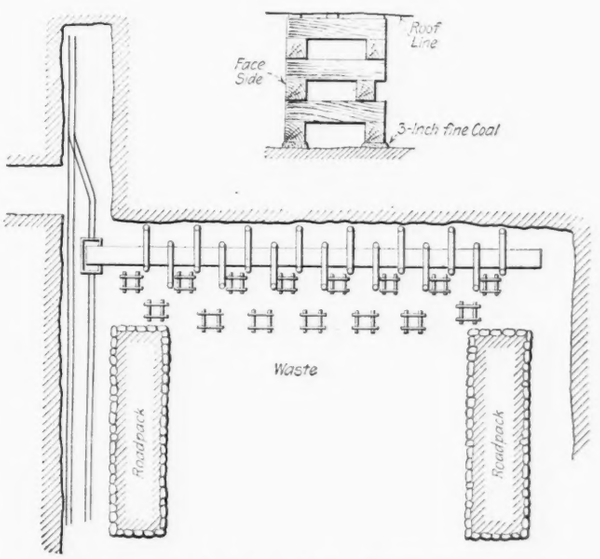
The installation of the necessary equipment proved to be very expensive. A large compressor plant was erected on the surface and this, together with the necessary pipe lines and receivers underground, required a large outlay for labor and material.

In the mine the face workings were stopped and brought to a straight line where the conveyor was to be set up. This meant a considerable loss of coal for the time. The main road was widened to 12 ft. and was made 8 ft. high, so as to permit the cars to be run under the loading lip of the conveyor. As shown in the accompanying sketch, a double track was laid on this road and a switch arranged to permit the cars to be run from the empty to the loaded track.

When everything was ready the work of installing the conveyor was commenced. This required the labor of ten men for three days, working three shifts of 8 hours each. As shown in the figure, the roof was supported at the face by crossbars resting on posts. The timber frames were set 4 ft. apart and staggered so as to permit the conveyor to be advanced or shifted forward as the work progressed. When this was to be done, the back row of timbers was first moved forward close to the face, and the conveyor was shifted the same distance.

Things went well for the first four days, the conveyor loading at the rate of ½ ton per minute when running. Ten men were employed digging coal and loading it onto the conveyor. Three boys at the delivery end handled the cars and trimmed the coal as it was loaded therein.

When the conveyor had been shifted forward twice the company asked the men to work on contract. Previous to this time they had been paid by the day. They accepted the proposition at a specified rate per "pull," by which was meant the shifting of the conveyor. Under the terms of the contract, the men were allowed an extra



SHOWING ARRANGEMENT OF FACE CONVEYOR

amount for all slate that must be moved. The rate was to be the same as that paid for daywork. At times it required 6 hours to shift the conveyor, and the men would then claim an extra allowance, which was generally given them by the boss.

However, the wages of the men working on contract were almost twice that paid for daywork. Much trouble was often experienced, owing to things that would happen when the boss was not around. A pick handle or a cap-piece would get into the belt and be carried back to the return end before it would be noticed. This would result in the chain being thrown off, which would cause a delay of from 2 to 3 hours.

Finally, another change was made, and the men were paid by the ton. In this arrangement the wages of the men were often three times that paid for daywork. The face was advanced so rapidly that it became impossible to shift the conveyor forward at the same rate, without causing heavy roof falls. In one instance almost half the conveyor was covered with slate.

About this time the company became discouraged and decided to remove the conveyor from the mine. I think it was shipped back to the makers. There was also some difficulty due to "rolls" that appeared in the floor and which thinned the coal in the seam. It was necessary

to level these rolls before the work could be continued. After the conveyor was taken out, the old "step system" of longwall was adopted to the great relief of the bosses.

Clinton, Ind. TIM GOLDON.

Cleaning Up a Roof Fall

Letter No. 10—I have read with interest and noted the opinions, expressed in the different letters, as to whether the assistant mine foreman performed his whole duty when he sent men to clean up a fall of roof, without cautioning them to first pull down any loose top and make themselves safe.

While I fully believe that, in the eyes of the law, the blame for this accident would rest on the assistant foreman, I realize that there are many things that should be considered before we censure the man too severely for his failure to do what the law says is his duty.

One can readily imagine the frame of mind in which this assistant would be when he gave the order for the men to clean up a fall that he was informed had occurred. Possibly the fall was on one of the main roads where it would block the cars and reduce the output of coal for the day. In that case, would it be any wonder that the assistant's first thought was to clean the road, taking it for granted that the men would make themselves safe?

POSSIBLE CONDITIONS THAT MAY SHIFT THE BLAME

It is possible, also, that the assistant was working for a foreman whose habit was not to consider safety before output, and this would naturally urge the assistant to take a chance and rush the work of clearing the road and getting the cars started.

Again, it is possible that the report did not indicate that the fall amounted to much, and the assistant who gave the order to the men considered them competent to take care of themselves. In that event, he would not think it important to give them special instructions about pulling down any loose top and setting timber to make themselves safe, as he would do in case the fall was a heavy one. When giving his order to the men he was probably in a hurry to attend to other important work.

In my experience I have been compelled to work under some of the worst top in this country. In company with others, I have been rushed to a fall and the work has been started without any previous sounding of the roof or setting of timbers. However, this did not happen more than once, as I determined to never again rush into danger in the same manner.

Habit is strong with men and, in certain coal fields, the custom of taking chances is so common, that it requires a terrible disaster to alter it and make them more cautious. Where the top is bad, men will often use less caution because of their familiarity with the danger. In mines where roof falls are common, men are frequently ordered, by the foreman in charge, to clean up the place or clear the road at once. In the hurry and rush of present-day mining and the urgent demand for coal, scant attention is given to many rules of safety.

The assistant is frequently imposed upon, in the position he occupies, both by his foreman and the men. A foreman does not usually give his assistant any authority and seldom allows him to use his own judgment. The assistant must be governed by the foreman's orders, which he often finds difficult to carry out with safety to the men in his charge.

Considering these various conditions, one is often in doubt as to whether this assistant foreman was wholly to blame for his failure to caution the men and instruct them how to proceed with the work. However, there is no question but what his failure made him directly responsible under the law, as he did not fulfill the law's requirements.

OSTEL BULLOCK.

Herrin, Ill.

Letter No. 11—The reading of the inquiry of "Miner," *Coal Age*, Jan. 20, p. 165, would seem to indicate that he thinks the assistant foreman was to blame for not instructing the timberman to pull down any loose rock overhead before starting to clean up the fall.

In my opinion, blame does not wholly attach to the assistant foreman for this accident. It is well to note, in this connection, that the Bituminous Mine Law of Pennsylvania, Art. 25, Sec. 1, requires that "the miner shall examine his working place before beginning work and take down all dangerous slate or otherwise make it safe by properly timbering it." It would seem to be just as much the duty of every timberman to examine the place to which he is sent and pull down all loose slate before starting to work, and the failure to do this makes him rightly to blame for the accident.

While the assistant foreman may have been guilty of some neglect, as a few seem to interpret the law, it must be remembered that his mind was largely taken up with other duties at the time. No practical mining man will deny that it was downright carelessness on the part of the man sent to perform this work for not taking the most ordinary precautions to make themselves safe. Indeed, it will generally be admitted that he was a poor example of a timberman.

It has been assumed by some writers that a man sent to do this work would be an experienced miner. If that is true, it must be acknowledged that the man had no regard for his own safety or that of his helper. Granting that, as "Miner" states, the assistant foreman made "a great mistake," the timberman certainly made a greater mistake, as his own safety was involved in his action.

COURT DECISION EXONERATES A MINE FOREMAN

This inquiry calls to mind a fatal accident that occurred to a miner in Somerset County two years ago. The assistant foreman in charge instructed the miner to set some posts before doing any work. Seeing him start to do this, the assistant proceeded on his rounds, only to hear, a short time later, that the man was buried under a fall. Although the assistant foreman was blamed for not staying to see that his orders were carried out, the County Court maintained that the assistant had fulfilled his duty when he had instructed the man to make his place safe.

In the mine where I am now employed, one man was killed and another badly injured by a fall of roof that took place shortly after the assistant foreman had made his examination. As usual, men were inclined to blame the assistant for the accident, when, as a matter of fact, he was not in the least to blame. The miners had a full cut of coal and were busy setting posts and fixing the road preparatory to shooting when the assistant was in the place. After he had gone, the men fired three or four

lots that knocked out some of the timbers. Without resetting the posts, they pushed the car toward the face and started to load the coal. It was while they were thus engaged that the roof fell, with the results stated.

The facts show that the men were wholly to blame and suffered for their neglect. Some miners require constant watching. Only the other day I went into a man's place and found him working under a dangerous piece of slate that was ready to fall at any moment. He was loading his coal wholly unconcerned. After setting the post, which I ordered him to do at once, and in reply to my question asking if he had not more sense than to work under a loose rock like that, he replied, "Oh, that piece would not fall for a long time." The remark goes to show the chances men will take in such cases. If miners would perform their duties as well as the foreman and his assistants perform theirs, there would be fewer accidents of this nature; but many men seem to think the mining law applies to mine officials more than to the miner himself.

OLIVER YOUNG.

Nu-Mine, Penn.

Checking In-and-Out System in Mines

Letter No. 10—The system employed for checking the men going in and coming out of the mine, at a large operation working from 1200 to 1500 men, was as follows:

Every man working in and about the mine had a check and a check number. The men working underground, including the mine foreman, his assistants and the firebosses, were all required to hang their checks on a board at the foot of the shaft. There were two boards, one for company men and the other for contract men. The hooks on these boards were numbered to correspond to the check numbers of the men.

The company men were given numbers from 1 up, starting with the mine foreman as No. 1. The checks of the contract men started with some number above the last check of the company men and were also numbered consecutively. The contract men, however, hung their checks on the hooks corresponding to their loading check numbers, which were not the same as the numbers of their personal checks.

TIMEBOOKS MARKED FROM CHECKS ON BOARD

A little after starting time, the mine foreman or one of his assistants would go over the check board and mark everybody as working that day whose checks were on the board. This record was kept in two books, one for the company men and the other for the contract men. The books also showed where each man was working. If a man was changed from one place to another, the change was marked at once in the book, so that the record showed how long each man worked in one place.

As the men came out of the mine, they were required to take their checks off the board and hand them to the cager, before they were allowed to step on the cage. The cager would only take the number of checks allowed for a single hoist, putting these at once in a box kept for that purpose. If a man came out early, the cager would ask the reason, make a note of the same and report it to the mine foreman or the checking clerk in charge of the office.

After waiting a reasonable time for all the men to come out of the mine, the cager would examine the check board to see if any checks remained there unclaimed. If he found any checks, he would refer at once to the book to ascertain where the man was working and proceed to hunt him up or notify someone in authority.

There was a penalty of a fine or discharge for anyone who failed to put his check on the board when going into the mine, although such a failure would result in the man's losing time for that day, as the book is marked by the checks on the board. There was no danger of a man failing to take his check from the board when coming out of the mine, because he would not be permitted to get on the cage without giving his check to the cager.

On his return to the surface, the cager took his box of checks collected from the men and, going at once to the office, delivered them to the checking clerk, whose duty it was to remain at the office from early in the morning till late at night, except for an hour or so in the middle of the morning and also in the afternoon, which he spent at home.

The check board in the office was arranged with pigeon holes that were numbered to correspond to the check numbers of the men. The checks were distributed in the pigeon holes by the checking clerk. Small blocks were provided that fitted these holes, and they were used by the clerk to place on the top of the check of any man whom the mine foreman wished to hold out of the mine. When such a man applied for his check, he was told by the clerk to see the foreman before it would be given him.

NO PERSON ALLOWED UNDERGROUND WITHOUT A CHECK

The same checking system applied to all men working on the surface, with the exception that they were required to take their own checks to the checking office when quitting work. No man was permitted to go into the mine without a check. Visitors, surveyors, electricians or machinists going into the mine were given blank checks, which were hung on the board when they went in and taken off when they came out.

The advantages of such a checking system are that the mine foreman can ascertain at the beginning of each shift what men are in their places and can regulate the work and make his arrangements accordingly. While the method I have described applies particularly to shaft mines, it can be used with slight modification in any drift or slope mine. In such mines the men could take their own checks to the checking office on coming out of the mine, and someone who was familiar with the mine should have charge of the check board to see that no one remained in the mine after the men were supposed to have gone home.

GEORGE A. BROWN.

Superior, Wyo. Mine Foreman.

Letter No. 11—Some years ago I was employed by the Vicoigne & Noeux Coal Co., of northern France. The system of checking in and checking out used at that mine was somewhat similar to that described by R. W. Lightburn, *Coal Age*, Feb. 17, p. 328.

Each man working underground was given a check stamped with his number. The man must give his check to the lampman before he can receive his lamp and enter the mine in the morning. The checks are dropped into a small box. This box is handed to a clerk each 15 min., while the men are going into the mine, and another box put into its place. This system differed from that described by Mr. Lightburn only in the fact that it

showed, within 15 min., the time when each man went to work, as well as the time when he quit and returned his lamp, receiving his check in exchange.

It was the duty of the clerk to record the checks, as he took them from the box each 15 min., by making a cross (×) against that number, in the proper column, in a book kept for that purpose. The book was ruled in 15-min. columns, and each man's check was recorded in the proper column when he went to work and when he returned his lamp at the close of the shift.

Each district foreman, before going into the mine in the morning, would go to the lamproom to ascertain who of his men were not in the mine. This would be indicated by the lamps that had not been delivered. The system that I have described was used quite generally in the mines in that district. GASTON LIBIEZ.

Peru, Ill.

Textbooks in Examination

Letter No. 17—The use of textbooks in mining examinations is advocated, I believe, because of the assumed need of technical questions that many candidates, who are practical mining men, would be unable to answer for the reason that they cannot recall the particular formula or constant required.

Allow me to state here that, in my opinion, there is little need for a mine foreman or fireboss using any mathematics, further than to compute a workman's time or calculate the volume of air passing in an airway having a given cross-section. The latter operation is so simple that a child can master it in a short time.

It is the idea, so largely prevailing, that a candidate for the position of mine foreman must understand the theory of coal mining and be able to work problems involving the use of formulas that has given rise to this demand for the use of textbooks in the examination. Nothing, however, is farther from the truth than to suppose that it will be easier for a candidate to apply a formula if he is given the privilege of referring to his textbook, in the examination. I want to say that if a formula is so hard that a candidate cannot commit it to memory, he will not know how to apply it when given a textbook.

BELIEVES FORMULAS OF NO VALUE TO MINE FOREMEN

Personally, I do not believe in mine foremen attempting to commit formulas to memory or to use them, as they seldom understand what they mean and how to apply them. They do not appear to me to have any practical value to a mine foreman, assistant foreman or fireboss. While they are of value in studying the theory of ventilation, I could never understand why such theoretical problems are necessary or should be included in an examination designed to ascertain the candidate's practical knowledge.

Allow me to ask of what value is it to a foreman to know how a given volume of air passing into a mine will divide between two or more splits of different lengths and areas; or why should he be asked to calculate the area of the opening in a regulator required to pass a certain quantity of air under a given pressure. The practical miner will build a regulator and open or close the shutter until he has the desired results, and this requires no formula or mathematical calculation.

In closing, allow me to recommend that the examination of mine foremen be confined strictly to practical work and that theoretical problems and questions relating to the principles of coal mining be entirely eliminated. My claim is that, even should a man become proficient enough in the use of formulas to know what they mean and how to apply them, he will still fail to find them of any practical use in the mine.

I regard theoretical questions as being of value only to the student of mining, and this is not the type or character of man required to take charge of a mine as foreman. Assuming that theoretical questions are eliminated, as I believe they should be, I can see no advantage in the use of a textbook in the examination. I. C. PARFITT.

Johnstown, Penn.

Letter No. 18—In my opinion, a man that is fitted to pass the examination for mine foreman, assistant foreman or fireboss should not need a textbook to do this. He should be able to remember some of the formulas pertaining to mine ventilation and pumping; but, above all, he should be a practical mining man thoroughly familiar with the mining law.

My observation and experience lead me to believe that a candidate may be able to solve all the mathematical questions asked in examination and yet not be a practical mining man and, perhaps, know little of the mine law. Such a man does not deserve to pass the examination, as he is not fitted to take charge of a mine.

On the other hand, if a man knows the mine law thoroughly, and is a practical miner, and able to show the examining board that he can measure the area of an airway, and calculate the time required for a certain pump to handle the water in a given sized sump, he should pass the examination and obtain a certificate of competency, provided he has good credentials in respect to his character and habits.

THE PLACE TO CARRY TEXTBOOKS IS IN THE HEAD

It is my opinion that a good mine foreman will carry his textbooks in his head and be able to use the information whenever and wherever it may be needed. I am not in favor of a man carrying a book in his pocket. I wonder what kind of foremen would soon be in charge of our mines if textbooks were to be allowed in the examination of candidates for that position.

I came to this country when 21 years of age, having had as yet no schooling in the English language. Notwithstanding this handicap, however, I now hold four certificates, which were obtained by passing the examinations without the aid of any textbooks. I want to ask: Why can not a man born in this country, and educated in the English schools, do the same thing? If he cannot I, for one, do not consider him fit to be a mine foreman.

In reference to the value of textbooks to mine foremen, I want to ask how many foremen today can be found who will be willing to spend their evenings at home reading a technical mining magazine or a book on practical mining. I can name foremen and firebosses who have not looked into a mining paper or a practical mining book after they passed the examination and secured their certificates. Instead, they spend their evenings in other ways. I believe that the use of textbooks in examination would tend to less study and reading by these men.

Snow Shoe, Penn. JOHN BOHN.

Inquiries of General Interest

Safety-Lamp Gauze

I am desirous of ascertaining whether the wire used in the manufacture of safety-lamp gauzes is iron or steel wire. The gauze is usually spoken of as "iron-wire gauze." Whatever information you can give me on this matter will be greatly appreciated.

A. G. BLAKELEY, Chief Chemist,
Philadelphia & Reading Coal and Iron Co.
Pottsville, Penn.

Before the European War interfered seriously with the importation of the wire gauze used in the manufacture of safety lamps in this country, practically all the material needed for this purpose came from England. The shipments were tagged "English iron-wire safety-lamp gauze." The wire used in the manufacture of the English gauze is made of Norway iron.

Some manufacturers in this country are still using the English gauze in the manufacture of their lamps, while others are using gauze made in this country. Some of the American gauze is made from basic iron wire, and some from bessemer steel wire. The wire is drawn by the American Steel and Wire Co. The wire of the English lamp gauze is sometimes described as "charcoal-iron wire," referring to its treatment in manufacture.

⁂

Selling-Agents' Contracts

Will you kindly direct me to where I can obtain information in regard to the prevailing selling-agents' contracts, covering the handling of coal from the mines of West Virginia and Kentucky, for shipment to Western points via the Lakes.

It has been intimated to me that a minimum price is usually agreed upon between the mine operator and the agent, who is then free to sell at any higher price without consulting the operator. It would, however, seem only reasonable that the selling price of large shipments of coal should be subject to the approval of the mine operators who make the shipments.

Any information you can give me directly or secure through the readers of *Coal Age* that will throw light on this matter will undoubtedly be greatly appreciated by others than myself who occupy similar positions and experience like difficulties in handling these coals on Lake contracts. SALES AGENT.

New York City.

Inquiry among agents controlling shipments of coal on Lake contracts has failed to elicit any definite information in reference to a form of contract in general use. As far as *Coal Age* has been able to learn, there is no fixed rule or practice covering this matter. Instances are given where a flat price was fixed by the mine owner, and the middleman sold at whatever price he could realize.

Again, we are informed that contracts have been made that were based on the cost of producing the coal. As is well known, the cost of production is quite variable in different mining districts and in different mines of the same district. It is also dependent, to a very large extent, on labor conditions and transportation facilities, car shortages, etc.

While the price may average $2 a ton, f.o.b. cars at the mine, the actual cost of production, per ton of coal mined and shipped, in particular instances, will be more or less than this amount, depending on conditions. Where the price is based on the cost of production, the amount realized by the sale of the coal above this figure is divided between the producer and the agent, after deducting the selling expenses.

⁂

Drawbar Pull vs. Speed and Grade

Kindly inform me if the rule for calculating the drawbar pull, given in answer to the inquiry, *Coal Age*, Feb. 17, p. 331, will apply to electric locomotives using current of different voltage and running at different speeds—say, for example, a locomotive using 250 volts and running at a speed of 8 miles per hour; or a 10-ton locomotive using 500 volts and running at a speed of 15 miles per hour, operating both on level track and on grades. Do the speed and the voltage used affect the drawbar pull?

Du Bois, Penn. MOTORMAN.

The voltage of the current used in operating a locomotive has no effect whatever to change the drawbar pull, which is calculated according to the method explained in reply to the previous inquiry (page 331).

The speed of running, within the limits of coal-mining practice, has an almost inappreciable effect on the drawbar pull, which is due to the track resistance of the trip hauled. Track resistance, which is understood to include both journal and flange friction, is always greatest at the moment of starting a trip and decreases rapidly as the speed increases, till a constant speed is attained. At a high speed of hauling, track resistance and, consequently, the drawbar pull is slightly less than at a lower speed; but this difference is hardly appreciable in mining practice.

The grade resistance of a loaded trip increases at the rate of 20 lb. per ton of load hauled, for each per cent. of grade. As stated in the letter of Graham Bright, on another page of this issue, grade resistance affects both the locomotive and the trip hauled. The effect on the locomotive is to decrease the available drawbar pull that the machine can exert. This was inadvertently omitted in the calculation of the maximum load a 6-ton mine locomotive can haul on a 2½ per cent. grade, in the last paragraph on page 331.

We are certainly very glad to have Mr. Bright draw attention to this omission, which occurred in a hurried preparation of that paragraph to close the page. The solution given in the last paragraph on page 331 failed to take account of the grade resistance of the locomotive.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—A total current of 8000 cu.ft. of air per minute is passing in three splits, A, B and C, the water gage on the fan drift reading 1.7 in. All the splits have the same cross-section, and their lengths are as follows: Split A, 6000 ft.; split B, 10,000 ft.; split C, 21,000 ft. It is desired to increase the quantity of air passing in splits B and C, so as to make all three splits pass the same quantity. Assuming that splits B and C will then each pass as much air as A passes before the change is made, (a) What will be the total quantity of air in circulation? (b) What water gage will be required to pass this quantity of air? (c) How much will the resistance be increased in splits A and B?

Ans.—The first step is to find the natural division of the air in the three splits, whose relative lengths are 6, 10, 21. The pressure being the same in each split and the perimeters and areas constant, the quantity of air passing in each airway is inversely proportional to the square root of its length, and the relative split potentials are then found as follows:

Split A, $\frac{1}{\sqrt{l}} = \frac{1}{\sqrt{6}} = 0.4082$

Split B, $\frac{1}{\sqrt{l}} = \frac{1}{\sqrt{10}} = 0.3162$

Split C, $\frac{1}{\sqrt{l}} = \frac{1}{\sqrt{21}} = 0.2182$

Sum of relative potentials = $\overline{0.9426}$

It is necessary, first, to find the quantity of air passing in split A, which is as follows:

$$q_a = \frac{0.4082}{0.9426} \times 8000 = 3464 \; cu.ft. \; per \; min.$$

(a) If splits B and C are each to pass the same quantity of air as was passing in split A before the change was made, the total quantity of air in circulation, after the change, will be $3 \times 3464 = 10{,}392$ cu.ft. per min.

(b) Now, finding the quantity of air passing in split C, before the change is made, we have

$$q_c = \frac{0.2182}{0.9426} \times 8000 = 1852 \; cu.ft. \; per \; min.$$

When the change is made the quantity passing in split C, is increased from 1852 to 3464 cu.ft. per min. and, there being no regulator, the pressure or water gage will vary as the square of the quantity of air passing. In other words, the water-gage ratio will equal the square of the quantity ratio. Hence, calling the required water gage after the change is made x, we have

$$\frac{x}{1.7} = \left(\frac{3464}{1852}\right)^2 = say \; 3.5$$

$$x = 1.7 \times 3.5 = 5.95 \; in.$$

The water gage producing the circulation after the change is made is therefore practically 6 in., and the total quantity of air in circulation about 10,400 cu.ft. per min.

(c) The resistance in an airway is equal to the unit pressure multiplied by the sectional area. But, the sectional area of all the airways being the same, the resistance varies with the unit pressure or water gage, the increase of resistance in splits A and B being in the same ratio as the increase in water gage, or as $5.95/1.7 = 3.5$ times the original resistance.

Ques.—(a) How many 1-in. pipes will it take to run off, in the same time, as much water as one 12-in. pipe? (b) How many 3-in. pipes will discharge the same quantity of water as one 12-in. pipe, in the same time, under the same head?

Ans.—For the same head and length of pipe, the quantity of water discharged will vary as the square root of the fifth power of the diameter of the pipe. Hence, the number of pipes of a smaller diameter required to discharge the same quantity of water as a single pipe of larger diameter, under the same head, is equal to the square root of the fifth power of the ratio of the larger to the smaller diameter.

(a) In this case, the ratio is 12 and the number of 1-in. pipes required to give the same discharge as one 12-in. pipe is $\sqrt{12^5} = 499$ pipes, nearly.

(b) The diameter ratio, in this case, is 12/3 or 4. Therefore, the number of 3-in. pipes required to discharge the same quantity of water as a single 12-in. pipe, in the same time, under the same head, is $\sqrt{4^5} = 32$ pipes.

Ques.—The distance from the fulcrum of a safety valve to the stem is 5 in.; the diameter of the valve seat, 2.5 in.; the weight of the lever, 15 lb. and its center of gravity, 10 in. from the fulcrum. If the ball weighs 75 lb., how far should it be set from the fulcrum in order that the valve will blow off at a boiler pressure of 90 lb. per sq.in.?

Ans.—The area of the valve is $0.7854 \times 2.5^2 = 4.908$ sq.in. The total pressure of the steam on the valve, at the moment of blowing off, is $90 \times 4.908 = 441.72$ lb. The moment of this upward pressure of the valve acting on the lever is $441.72 \times 5 = 2208.6$ in.-lb. But, at the time when the valve blows off, the moment of the upward steam pressure is equal to the sum of the moments of the weights of the lever and the ball, both acting downward. The weight of the lever acts through its center of gravity and its moment is $15 \times 10 = 150$ in.-lb. Calling the distance from the fulcrum to the ball x in., the moment of the weight of the ball is $75x$, and this also acts downward. Therefore, equating these moments, we have

$$75x + 150 = 2208.6$$

$$x = \frac{2208.6 - 150}{75} = 27.45 \; in.$$

[The first two of these three questions are excellent for drill in the study of mine ventilation and drainage and pumping, but much too difficult to require in the examination of candidates for mine foremanship.—Editor.]

Coal and Coke News

Washington, D. C.

Among the acts passed by Congress during its closing hours was one described by the Department of the Interior as an act under which surplus lands in Indian reservations will become subject to settlement and entry notwithstanding that they may be withdrawn as coal lands or valuable for coal deposits.

These lands heretofore have not been subject to agricultural entry for the reason that there was no law under which entrymen might acquire title to the surface with reservation of the coal deposits to the Government. The present act provides for such agricultural entries and for the issuance of patents to entrymen with reservation of the coal, and the right to mine same, to the Government. This act will open to entry several hundred thousand acres of land in Indian reservations.

A decision has been entered by the Interstate Commerce Commission in the case of the Big Muddy Coal and Iron Co. against the Illinois Central and other roads, declaring that the rates on bituminous coal in carloads from mines in the southern Illinois group to St. Charles, Mo., are unduly prejudicial as compared with the rates on the same commodity from the Belleville, Ill., group to St. Charles. The Commission entered an order fixing the former rates at not in excess of 15c. above the latter rates, effective May 15 next.

A second decision issued by the Commission justified in part only the proposed increased rates on coal from mines on the Chesapeake & Ohio Ry. in West Virginia and Kentucky to Brooksville, Ky. The only increase allowed by the commission is a joint rate of $1.35 per short ton from groups 2, 3, 4 and 5, out of which there will be available to the Chesapeake & Ohio its present division of 80c. and to the Brooksville Railroad Co. 45c., the amount of its local, as their respective proportions. Upon a similar basis the Commission allowed a joint rate from group 1 mines.

Two important long and short haul orders were entered by the Interstate Commerce Commission during the past week. They first granted the application of the roads in respect to the movement of coal from Chicago, Ill. In this instance the Commission authorized the Chicago, Burlington & Quincy R.R. "to maintain rates on hard coal from Chicago, Ill., and points taking same rates to points on its line in Nebraska, South Sioux City to Laurel, inclusive, the same as the rates contemporaneously in effect on like traffic via the more direct lines, and to maintain higher rates to intermediate points, provided that the rates to Yutan and points south thereof do not exceed $2.65 per ton; that the rates to points north of Yutan to and including Oakland, Neb., do not exceed $2.70 per ton; and that the present rates to other intermediate points are not exceeded."

In the second case the Commission authorized the same road to maintain "rates on soft coal, carloads, from East St. Louis, Ill., group and groups 4 and 5, as shown in tariff of the Chicago, Burlington & Quincy Railroad Co., I. C. C. No. 10589, to Carrollton, Mo., the same as the rates contemporaneously in effect from and to the same points via the more direct line of the Wabash Railway Co. and its connections, and to maintain higher rates to intermediate points, provided the present rates to said intermediate points are not exceeded."

Seattle Station to Investigate Coal

That the Seattle station of the Bureau of Mines is to be devoted entirely to a study of metalliferous problems is an erroneous impression which seems to have become widely disseminated. As a matter of fact an important portion of the work of this station will have to do with the investigation of coal problems. Dorsey A. Lyon, the superintendent of the new mining experiment station, classifies the work into three main divisions. Second only to the study of the application of electro metallurgy, Mr. Lyon classes the coal work which he already has started. The coals of the Northwest and of a portion of Alaska are to be studied with the idea of determining how they may be mined with the least possible waste. The beneficiation of low-grade coals is to be the subject of extensive research in the hope of rendering them suitable as fuels for domestic and industrial use.

Prof. E. J. Babcock, of the Bureau of Mines staff, is engaged in a study of the coals of the Nenana field in Alaska. Briquettes made by Prof. Babcock from this coal have recently been received at the Bureau of Mines. Tests show that these briquettes are equivalent to a good grade of steam coal. They were made in the laboratory under conditions which indicate that they can be made profitably on a commercial scale. Since the fuel problem is a serious one in eastern Alaska, where the price of wood already is so high as to interfere seriously with mining operations, the promising results of Prof. Babcock's experiments are regarded by George S. Rice, chief mining engineer of the Bureau, as being of unusual importance.

Owing to the necessity of securing a mining engineer to take direct charge of the coal mining investigations of the Bureau of Mines, every effort is being made by officials of that bureau to arouse interest in the civil service examination which will be held Mar. 27, for this position. The place became vacant at the death of L. M. Jones. Despite the fact that a salary of $4000 is paid for this service, the demand in private employment is so great that difficulty is anticipated in securing, for this salary, a man with the proper experience. Bureau officials hope, however, that some well-qualified man, whose bent toward investigative work may be sufficiently decided to induce him to consider this place, may be secured. It is recognized that a man possessing the requisite qualifications for this position would be able to command a better salary in private work.

Recent explosions of oxygen tanks have led to criticism of the electrolytic process of making oxygen. Due to the fact that the Bureau of Mines is a user of oxygen in mine rescue work, George S. Rice, chief mining engineer, is conducting an investigation of the impurities in oxygen which are held to be responsible for the explosions. Mr. Rice finds that it is not a question of discountenancing the electrolytical or other process of manufacture but it is a matter of specification. The Bureau of Mines has found for its own purposes that the hydrogen content must be less than $\frac{2}{10}$ per cent. and the nitrogen must be less than 2½ per cent.

By following the rules and regulations of the Bureau of Mines looking to preparedness for emergency, several lives were saved recently as well as one of the mines of the Owl Creek Coal Co., according to R. J. Ireland, the president of the company. Despite a threatening fire in one of the company's mines at Gebo, Wyo., the workers left the property without mishap and a minimum amount of material damage resulted.

Reports to the Federal Reserve board from regional banks are to the effect that coal mines in the Birmingham district are increasing their output. Colorado coal mines are said to have broken all records in January. Operators in Oklahoma are said to be receiving a decreased volume of orders but still have bookings for sufficient business to keep the mines in operation at full capacity for an indefinite period.

HARRISBURG, PENN.

Chairman Ramsey of the House Committee on Mines and Mining has fixed Tuesday, Mar. 13, as a time for a hearing on the mine code prepared by James E. Roderick, Chief of the Department of Mines. This hearing will be one of two given by the committee to receive information on the bill. It will be devoted to the side of the miners and the second hearing to the operators.

The Chief of the Department of Mines contends that the code would reduce mine accidents 50 per cent. and feels sure that the committee will agree with him and see the necessity of speedily reporting out the bill.

Another bill backed by the State Department of Mines, which is attracting considerable attention is House bill No. 434, providing for first-aid corps and rescue corps in the coal mines of the state. The committee on Public Health and Sanitation has not yet announced a date for a hearing, but it is understood that the Chief of the Department of Mines will agree to amend section 5, to read "Each first aid corps and each rescue corps shall consist of three strong and intelligent persons, recruited from volunteers among, officials and employees and who shall be properly trained by those in charge of such work."

Representative Daniel Snyder of Westmoreland County has introduced a bill drawn by the State Mining Department relating to and regulating the locating, drilling, operating and abandoning of oil and gas wells in the bituminous coal region. A similar bill was introduced during the sessions of 1911, 1913 and 1915, but with the present bill in the hands of Mr. Snyder, who is considered one of the most able men in the Legislature, it is apparent that people behind the measure "mean business" this session, and it is expected that the bill will be reported from committee at an early date.

A bill introduced by Senator Crow of Fayette County, and thought to be backed by bituminous interests will make it lawful for the owners or lessees of coal lands, coal mines, etc., in the vicinity of any railroad, canal or slack water navigation or navigable river to survey and mark out a route for and build and maintain in, upon and over any intervening lands an aërial tramway or system of aërial transportation for the carrying and transporting of the products of coal lands, coal mines, etc., to such railroad, river or canal.

Senator Charles A. Snyder, of Schuylkill County, has introduced a bill to amend the act of 1891 (anthracite) which provides that in case the Inspector becomes incapacitated to perform the duties of his office for a longer period than two weeks the Chief of the Department of Mines shall deputize some competent person of the county from which said inspector was elected, recommended by the Board of Examiners, to fill the office of mine inspector until the said inspector shall be able to fulfill the duties of his office. If Senator Snyder's bill becomes a law it will take the appointing power away from the courts.

A bill said to be promulgated at the suggestion of the United Mine Workers and other trade unions has been introduced in the House by Mr. Fowler from Lackawanna County.

This bill provides that it shall not be unlawful for working men to organize themselves into labor organizations for the purpose of lessening the hours of labor or increasing the wages or bettering the condition of the members of such organization or carrying out their legitimate purposes as freely as they could do if acting singly.

It also provides that no restraining order or injunction shall be granted by any court of this state or any judge or judges thereof in any case involving or growing out of a dispute concerning terms or conditions of employment, unless necessary to prevent irreparable injury to property or to property rights of the party making application.

It is further provided that no restraining order or injunction shall prohibit any person from terminating any relations of employment or recommending, advising or persuading others to do so or from attending at any place where persons may lawfully be for the purpose of obtaining or communicating information or from persuading any such person to work or abstain from working or from ceasing to patronize any party to such dispute or from recommending or advising others to do so.

In Sec. 4, the bill states that labor of a human being is not a commodity or article of commerce and the right to enter into relation of employer and employee shall be construed to be a personal and not a property right. In all cases involving the violation of the contract of employment, either by the employee or employer, where no irreparable damage is about to be committed upon the property or property rights of either no injunction shall be granted, but the parties shall be left to their remedy at law.

Representative James Maurer has introduced amendments to the compensation law to include among those receiving benefits for compensatory disability those suffering from vocational diseases, or those who have become ill through infection upon the premises of the employer.

As the law is now effective, compensatory disability is for injury and personal injury, that is, violence to the physical structure of the body. The amendment would include within that class "such diseases or infections as may be found to be vocational, or to adhere in the condition of the premises or to result naturally from the operation of the employers' business or affairs thereon."

Mine workers contended that they would also come under the Maurer bill, as it would take care of miners who have contracted asthma or tuberculosis during the course of their employment, and that these would be regarded as vocational diseases, and therefore compensatory, if the amendment be adopted.

Municipalities in the coal fields of the state that have been hoping to secure through state taxation funds to pay for mine cave damages, face the serious possibility of seeing coal taxed by the state with no return of the tax money to the counties from whence the coal was taken.

Representative Davis, in framing his bills, devised a means to get around the Roney act of 1913 that was declared unconstitutional in 1915, by framing two separate bills. One bill includes a tax of 2½ per cent. advalorem at the mines on anthracite and bituminous. Half of the tax, this bill provides, would go to the state for highways; the other half is left undisposed of in the bill and would go into the state treasury. But the second bill provides that half of the tax raised be returned to the counties in which the coal is mined and distributed to coal mining municipalities according to population.

It is pointed out that if the first bill be passed and approved by the governor, it will

stand the constitutional test. If the second bill fails to pass, however, or is vetoed by the governor or is later declared unconstitutional. the coal regions will see the coal tonnage being taxed the same rate as was provided by the Roney and Dawson bills, and all the money going into the state treasury with not a cent returning to the coal counties.

The bill being handled by Senator Lynch of Lackawanna County, to so regulate mining as to prevent surface subsidence and damage to property from mine caves had a brief stay upon the senate calendar and is now back in committee on mines and mining until after the legislative recess, which ends Mar. 12. It is reported that the bill will be placed on the calendar when the senate convenes after the recess, and on Mar. 13 it will pass second reading. On the latter date a time will be set for a public hearing on the bill before the senate.

The only reason given by the senate leaders for having the bill recommitted, was that they didn't want such an important bill "floating around on the calendar during the 12-day recess."

PENNSYLVANIA

Anthracite

Pittston—For every 126,300 tons of coal mined in the Ninth anthracite district during 1916, one life was lost, according to the report of Mine Inspector Hugh MacDonald. This shows a total tonnage by the 13 collieries of 2,904,896. There were 22 fatal accidents.

The total production of the mines of the Eighth anthracite inspection district for 1916 was 3,756,626 tons, according to the report of Inspector Robert Johnson to the State Department. There were 29 fatal accidents, or one death for every 129,542 tons produced. Twenty women became widows as the result of these accidents and 53 children were made fatherless. The No. 9 colliery of the Pennsylvania Coal Co. was high producer, with 814,702 tons.

Hazelton—A tunnel started in 1847 was recently completed when it was pushed into the Lehigh Valley Coal Co.'s Buck Mountain workings. In 1874 this tunnel was run as far as No. 1 basin. In 1915 the Portland Contracting Co. began work on the continuation of the tunnel to No. 2 basin. As it now stands, the tunnel is 1650 ft. in length, 900 ft. of the distance being through solid rock.

Inkerman—Sixty employees of the No. 6 colliery recently gathered at the home of Robertson Baird in honor of his 60 years of service at this colliery. The guests presented him with a morris chair, the presentation speech being made by John J. Gannon, outside foreman at the mine.

Reading—The Evans Coal Co. has leased a tract of land from the Lehigh Valley Coal Co. near Beaver Meadow, and expects to erect a breaker this spring.

Bituminous

Connellsville—Coke production in the Connellsville district recently amounted to 358,461 tons, being a gain of 46,837 tons over the preceding week. Shipments were 352,085 tons, being a gain of 63,311 tons.

Somerset—The new mines of the Black Coal Mining Co. are almost completed and coal will be shipped within a short time. This is a new company of which S. B. Black of Meyersdale is president.

Houtzdale—All business was suspended in the twin mining towns of Ramey and Beulah, Clearfield County, on Mar. 2, during the funeral of Chester A. Minds, his wife, son and sister, who were all killed in the Mt. Union wreck on the Pennsylvania R.R. Feb. 26. About 400 miners employed in the Minds operations attended the funeral in a body.

Pittsburgh—Two coal districts are about to be opened by the Pennsylvania R.R., through the construction of two new branch lines. The Green County holdings of J. V. Thompson and his associates will be brought into the market by a railroad which will run up Ten-Mile Run off the Monongahela Division. A large territory of undeveloped coal in Westmoreland County also will be made accessible by an extension of the Turtle Creek Valley R.R., thus bringing Saltsburg many miles nearer to Pittsburgh through almost direct route.

Heilwood—"Clement" is the name chosen by the Penn-Mary Coal Co. for its new town about 2¼ miles from Heilwood, in Pine Township, Indiana County. Penn-Mary mines Nos. 11 and 12 will be opened at this point. The contract for 44 new houses has been let to the Hyde-Murphy Co. of Ridgway to be erected at once, more houses will be built as the work develops and a large store and office building will also be constructed. The construction work of the mines has been going on for some time and when completed will give employment to about 600 men.

Homer City—The Homer City Coal Co. will erect a modern repair shop at its Tearing Run mine near here. Besides the repair work, mine cars will be built for the other mines of the company. The new shop will be electrically equipped.

Dunlo—Several miners are leaving this region for other coal fields at the present time. Labor dissensions and shortage of car supply are said to be responsible for their departure.

Portage—The Therman Coal Co. will open its third mine here in the near future. The operation will include a shaft and will represent an investment of about $100,000.

Somerset—The shipment of coal from the mine of Neel Smokeless Coal Co. at Blough Station has begun. The plant has been completed and is modern in every respect. It will employ about 100 men. It is located on the Baltimore & Ohio R.R.

Reynoldsville—Fire, early Sunday morning Mar. 4, destroyed the tipple at the Soldier Run mine of the Jefferson & Clearfield Coal and Iron Co. In connection with the tipple is a large crusher and storage bins for the slack used for the coke ovens. These were also destroyed together with about 500 tons of slack in the bins. The cause of the fire is unknown but it is thought to have been incendiary. The loss will be about $40,000 and will throw about 500 men out of employment until the new tipple and bins can be erected. For many years the Soldier Run tipple was the largest and most modern in the world.

WEST VIRGINIA

Wheeling—The scarcity of men for work in the coal mines is indicated by a complaint made by an army recruiting officer, who says that men brought in by the men in his party to enlist have been on several occasions induced to take work in the coal mines.

Clifton—Plans are under way for the construction of a coal tipple on lands purchased recently by Charleston, W. Va., capitalists, and an electric power plant will also be built, with a view to furnishing current for various purposes in this vicinity.

Springton—The new tipples of the S. J. Patterson Pocahontas Co., and Turkey Gap Coal Co., are now in operation. They are of modern type and complete in every detail for preparing graded coals.

Moundsville—A new electric locomotive was recently placed in the Glendale mine. After this machine was started down the shaft, it was found to be too large by a few inches, and the rock had to be chipped out down the shaft to the bottom. This work was done at night for several nights so that regular mining might not be interfered with.

Fairmont—A new mine, the Waldo No. 4, at Wilsonburg, was recently purchased by the Clark Coal Co., and is now under development. The present output of the mine is small, but it is expected that it will be rapidly increased.

Clarksburg—The Ryan Coal Co. recently started operations at its new Haymond mine; about 25 men are employed. It is planned to considerably enlarge this mine and make it one of the best of its kind in the region.

VIRGINIA

Pocahontas—The tipple at the West Mine of the Pocahontas Consolidated Collieries Co. recently caught fire early one morning. The fire being in the top of the tall structure, the firemen had great difficulty in reaching it with water. It burned stubbornly for about an hour, in spite of all efforts to subdue it. It was, however, finally got under control with four streams of water. The damage is estimated at from $3,000 to $4,000. The quickness with which the fire companies responded to the call prevented what might have been in a short time a serious conflagration.

ALABAMA

Birmingham—The Sloss-Sheffield Steel and Iron Co. is constructing 10 four-room dwellings for employees at its Brookside Division. The output of coal and coke at this point is being pushed to capacity. A large club house is also being constructed by this company for the use of its employees at Bessie Mines. This building will include an assembly hall for first-aid and helmet teams at that plant.

KENTUCKY

Louisville—Sweeping changes in the policy of the Louisville & Nashville R.R. are said to have been decided on as a step toward healing the breach existing between the road and coal operators on various parts of the system, with respect to the car supply and contract coal for the company's use. Mines in the Hazard section are declared to have reached an understanding with the railroad company. The railroad is said to have made it known to the operators all over its system that the alleged preferential furnishing of cars will cease, that rolling stock will be furnished impartially to the mines whether coal to be loaded is for its use or for commercial purposes. Negotiations are under way also, it is said, by which the question as to price to be paid by the railroad for coal will be agreed upon. Conferences between representatives of the railroad and coal operators are scheduled to be held in the near future. At the offices of the Louisville & Nashville railroad, however, it was stated that no "sweeping" changes were contemplated and that the course of the road was largely prescribed under the requirements of the Interstate Commerce Commission.

Hazard—The closing recently of a deal with the Louisville & Nashville Railroad Co. for the delivery during the present year of over 2,000,000 tons of Hazard coal at $1.75 per ton will guarantee the active operation of the mines hereabouts. This will approximate about one-tenth of the entire production of this field. Among the companies in the deal are the Kenmont Coal Co., the Diamond Block Coal Co., the Ashless Coal Corporation, the Daniel Boone Coal Co., the East Tennessee Coal Co. and others.

OHIO

Pomeroy—The Peacock Coal Co., located in the Pomeroy Bend field announces the opening to two additional mines, which brings the total number to five. The two mines are modern in equipment and the output of the concern is increased about 50 per cent. The sales office is located in Columbus.

Columbus—State institutions will have to buy Ohio-mined coal if the majority of the Senate has its way. By a 19 to 4 vote, the upper house recently adopted Senator Galbreath's joint resolution requiring that preference be given Ohio coal operators whenever possible.

Athens—A call for the annual convention of the 10,000 United Mine Workers of the Hocking Valley district has been issued. The convention will be held at Glouster, Mar. 21. Officers of the miners' organization say plans will be made at this meeting to demand a substantial wage increase when the present wage scale with the coal operators expires early next year. The miners maintain that they are not sharing in the prosperity now being enjoyed by the operators and in addition must have more money to meet increased living costs.

ILLINOIS

Belleville—On account of the open and dry winter water is a scarcity at the mines in this section, especially those on the lines of the Southern Ry., and many of them have been idle on account of having no water with which to operate.

Marion—After waiting three years since the destruction by fire of the Carterville District mine here, the miners are now to receive the $7590 owed them in wages which it was impossible to secure on account of the property being bankrupt. The Peabody Coal Co. purchased the property, and is now paying off the miners before any of the coal in the lease can be mined.

Springfield—Governor Lowden's consolidation bill, which concentrates more than a hundred state departments into nine, has now passed both houses of the Illinois Legislature and has received the Governor's signature. It is expected that the nine department heads will be named within a few days. One of these is the Department of Mines and Mining. The law will go into effect on July 1.

A resolution has been introduced in the Legislature by Representative Frank Holten of East St. Louis for an investigation of the coal shortage. It provides for the appointment of a committee to report during the present month.

There will not be the usual spring shutdown in the Central Illinois mine field, according to Duncan McDonald, Secretary-Treasurer of the United Mine Workers of Illinois. He thinks it likely that there will be no shutdown even in the summer. At no time in the past ten years have operators had so many contracts and orders, he says. With factories working overtime the operators have had all that they could do to meet the demand. Double shifts are not feasible at most mines because there must be time for the shotfirers to do their work, but every mine is working all the men that can be had. At the Pana mines, however, double shifts are being worked and more coal has been brought to the surface in the past three months than ever before in a similar period. The Pana mines have enough orders to keep them running steady for six months.

The Central Illinois Operators Coal Bureau in its investigations as to the cost of producing coal recently found that there was an actual difference of 75c. a ton in what operators claim was their producing cost. Some operators had a price 75c. under other operators, and the Bureau is now engaged in ascertaining the true cost.

Harrisburg—A judgment for $9000 has been awarded in the Circuit Court here against the O'Gara Coal Co. in favor of John Campbell, a miner, for the loss of both eyes in a gas explosion in the company's mine at Eldorado. Campbell sued for $50,000.

Herrin—The tonnage for Williamson County commercial mines for February was close to 800,000 tons. The largest producing single mine was the Peabody No. 3 at Marion with 55,097 tons. Reports show that the largest tonnage was assisted by the Taylor Coal Co. from 3 mines with 58,319 tons.

Personals

J. T. Smith has been appointed superintendent of the Sayre mine of the Sloss-Sheffield Steel and Iron Co., F. T. Palmer having resigned from this position.

Isaac **T. Mann**, of Bramwell, W. Va., and associates, recently purchased 75 acres of Pocahontas coal land three miles west of Boissevain, Va. It is said that $60,000 in cash was involved in this deal.

R. D. Jeffers, formerly western sales agent for the Producers Coal Co. with headquarters in Cincinnati, has taken the position as western manager for the Davis Colliery Co. This position was made vacant by the resignation of Maury Robinson, who has entered the vinegar business in Arkansas and Texas.

Frank Howard who for years has been chief clerk in the mining plant of the West Kentucky Coal Co. near Russellville, Ky., resigned recently to accept a position with the Kenmont Coal Co. Jeff, Ky., in the Hazard field. It has not been made known just what position Mr. Howard will fill with the latter company.

W. T. Burgess, of the Birmingham, Ala., Federal Mine Rescue Station, is making a tour of the mines of the district and training teams in rescue and first-aid work. He announces the following dates and places of visitation: Acmar, Ala., Mar. 8 to 14; Marvel, Mar. 16 to 24; Garnsey Mines, Mar. 24 to 31; Flat Top, Apr. 11 to 18.

George Schwartz, sales manager of the Buckeye Coal and Railway Co., was the host at the weekly dinner and informal business session of Columbus shippers, held at the Chittenden Hotel, Mar. 2. The time was taken up with a discussion of the hearing before the utilities commission on the car shortage and railroad congestion.

Samuel J. Jennings, formerly a state mine inspector, but now a colliery superintendent for the Lackawanna company, entertained the meeting of the Pittston Mining Institute recently with an address on "Reminiscenses of a Mine Inspector." The institute is conducting a series of discussions of the question of silting old mine workings.

W. H. Clingerman, of Pittsburgh, Penn., president of the H. C. Frick Coke Co., the U. S. Coal and Coke Co., the Bunsen Coal Co., and others, was among the uninjured in the wreck on the Pennsylvania R.R. near Mt. Union, Penn., recently. In this wreck all the occupants of one car, 20 in number, were killed. No other passengers on the train were injured.

Henry Frantz, Jr., formerly foreman of the Canoe Ridge No. 1 mine of the Clearfield Bituminous Coal Corporation at Rossiter has been promoted to superintendent of the company's operations at Rossiter to succeed Malcolm McDougal, who resigned recently to accept a position with the State Insurance Fund. Mr. McDougal has his headquarters in Johnstown, Penn.

Obituary

William B. Shaffer of Somerset, Penn., a well-known mining and civil engineer and prominently known in the line of optioning coal fields died at his home on Feb. 26 at the age of 75 years. Death was due to heart trouble.

H. B. Dunham, formerly traffic manager of the Hocking Valley Railway Co., and one of the best known traffic men in the Middle West died at Ashville, N. C., recently from a complication of diseases. He had been in poor health for several years and was forced to relinquish his duties with the railroad last November. He was born at Manlius, N. Y. in 1854 and had been in active railroad work for about 30 years. His first position was with the Muskingum Valley R.R., leaving there to go in the traffic department of the C. A. & C., before it was absorbed by the Pennsylvania. He had been traffic agent and later traffic manager for the Hocking Valley for 17 years. His body was brought to Columbus, Ohio, for burial.

Recent Coal & Coke Patents

Mine Cap. G. Adams, Dartmoor, W. Va. 1,217,547, Feb. 27, 1917. Filed Aug. 2, 1916. Serial No. 112,780.

Coal Hod. R. L. Clark, Union, W. Va. 1,217,706, Feb. 27, 1917. Filed Mar. 15, 1916. Serial No. 84,336.

Mine Shaft Gate. J. J. Collier, Irwin, Penn., 1,211,412, Jan. 9, 1917. Filed Jan. 14, 1916. Serial No. 72,050.

Coke Oven. L. Wilputte, New Rochelle, N. Y. 1,213,988, Jan. 30, 1917. Filed June 19, 1916. Serial No. 104,377.

Mining Machine. E. C. Morgan, Morgan Park, Ill., 1,213,582, Jan. 16, 1917. Filed Nov. 3, 1910. Serial No. 590,445.

Coal Emptier. M. Pellegrino, New York, N. Y., 1,212,252 Jan. 16, 1917. Filed May 29, 1912. Serial No. 700,496.

Stoker Mechanism. W. C. A. Henry, Columbus, Ohio. 1,215,529, Feb. 13, 1917. Filed Feb. 26, 1913. Serial No 758,802.

Safety Mine Hoist. G. F. Royer, Wilkes-Barre, Penn. 1,213,956, Jan. 30, 1917. Filed Nov. 10, 1915. Serial No. 60,731.

Coal Handling Machinery. S. Butler, Sharples, W. Va. 1,214,646, Feb. 6, 1917. Filed Apr. 24, 1915. Serial No. 23,596.

Coal Tipple. T. J. Williams, Coalwood, W. Va., 1,212,733, Jan. 16, 1917. Filed Nov. 16, 1916. Serial No. 61,803.

Conveyor Bucket. S. E. Pfahler, Hopewell, Va., 1,213,408, Jan. 23, 1917. Filed Mar. 20, 1916. Serial No. 85,324.

Safety Stop for Mine Cars. W. D. Moon, Blocton, Ala. 1,217,620, Feb. 27, 1917. Filed Dec. 2, 1916. Serial No. 134,644.

Carbon Consumer for Boilers. J. S. Andrews, Gary, Ind. 1,216,392, Feb. 20, 1917. Filed May 6, 1915. Serial No. 26,253.

Safety Mine Car Brake. I. Machamer, Wiconisco, Penn. 1,214,341, Jan. 30, 1917. Filed Aug. 8, 1916. Serial No. 113,791.

Portable Coal Screening Rig. C. S. Williamson, Chicago, Ill., 1,213,322, Jan. 23, 1917. Filed Nov. 3, 1911. Serial No. 658,301.

Conveying Apparatus. C. S. Williamson, Chicago, Ill., 1,213,323, Jan. 23, 1917. Filed Dec. 1, 1915. Serial No. 64,591.

Device for Holding Mine Cages. W. H. Price, Butte, Mont. 1,215,409. Feb. 13, 1917. Filed Aug. 15, 1916. Serial No. 115,047.

Pull Switch for Electric Mine Signals. C Clauson, Bisbee, Ariz. 1,217,707, Feb. 27, 1917. Filed Apr. 19, 1916. Serial No. 92,171.

Coal Handling and Storing Apparatus. J. B. Phillips, Portland, Me. 1,216,603, Feb. 20, 1917. Filed May 21, 1914. Serial No. 839,931.

Stop Mechanism for Mine Hoists. D. F. Lepley, Connellsville, Penn. 1,216,143, Feb. 13, 1917. Filed Dec. 3, 1914. Serial No. 875,353.

Reinforced Center Frame for Boiler Grates. J. Mahon, Ravena, N. Y., 1,213,521, Jan. 23, 1917. Filed June 26, 1916. Serial No. 105,899.

Automatic Car Dumping Appliance. J. H. Baker, Fairfield, Ill., 1,213,327, Jan. 23, 1917. Filed Aug. 25, 1916. Serial No. 116,881.

Grate Bar for Marine and Stationary Boilers. W. C. Codd, Baltimore, Md., 1,212,018., Jan. 9, 1917. Filed May 3, 1916. Serial No. 95,218.

Apparatus for the Manufacture of Gas. H Begemann, Portland, Me. 1,217,554, Feb. 27, 1917. Filed June 25, 1914. Serial No. 847,311.

Coal Jigs, Automatic Clutch Mechanism for. G. E. Reynolds, Wyoming, Penn. 1,217,502, Feb. 27, 1917. Filed June 2, 1916. Serial No. 101,395.

Coke Oven Construction. G. E. Thackary, Westmont Borough, Penn., 1,211,502, Jan. 9, 1917. Filed Oct. 28, 1913. Serial No. 792,201.

Furnace Door Operating Means. T. G. Selleck, assignor to Deere & Co., Moline, Ill. 1,215,418, Feb. 13, 1917. Filed Apr. 3, 1916. Serial No. 88,577.

Underfeed Stoker. W. J. Kenney assignor to Underfeed Stoker Co., Chicago, Ill., 1,211,592, Jan. 9, 1917. Filed Oct. 10, 1914. Serial No. 86,602.

Mining Machine. G. B. Norris, assignor to Jeffrey Manufacturing Co., Columbus, Ohio. 1,215,692, Feb. 13, 1917. Filed Dec. 18, 1915. Serial No. 292,372.

Ash Conveying System. A. P. Strong assignor to Green Engineering Co., East Chicago., Ill., 1,211,500, Jan. 9, 1917. Filed Oct. 11, 1916. Serial No. 124,923.

Mining Machine. C. J. E. Waxborn assignor to Jeffrey Manufacturing Co., Columbus, O., 1,212,717, Jan. 16, 1917. Filed Sept. 18, 1913. Serial No. 790,442.

Manufacture of Briquetts. F. A. Vogel assignor to General Briquetting Co., New York, N. Y., 1,212,291, Jan. 16, 1917. Filed July 22, 1916. Serial No. 110,655.

Mounting for Wheels and Axles of Mine Cars. W. A. Dorsey, assignor to Bonney-Floyd Co., Columbus, Ohio. 1,215,629, Feb. 13, 1917. Filed July 13, 1915. Serial No. 39,558.

System for Feeding Pulverized Fuel. V. Z. Caracristi, assignor to Locomotive Pulverized Fuel Co., a corporation of Delaware. 1,214,753, Feb. 6, 1917. Filed Oct. 4, 1913. Serial No. 793,311.

Publications Received

Underground Latrines for Mines. By Joseph H. White. Dept. of the Interior, Bureau of Mines, Technical Paper 132. Illustrated; 23 pp., 6x9 in.

Elementary First Aid for the Miner. By W. A. Lynott and G. Harrington. Dept of the Interior, Bureau of Mines, Miners' Circular 23. Illustrated; 23 pp., 6x9 in.

Monthly Statement of Coal Mine Fatalities in the U. S., November, 1916, compiled by Albert H. Fay, Dept. of the Interior, Bureau of Mines. Unillustrated; 30 pp., 6x9 in.

Monthly Statement of Coal Mine Fatalities in the U. S., September, 1916, compiled by Albert H. Fay, Dept. of the Interior, Bureau of Mines. Unillustrated; 32 pp., 6x9 in.

Monthly Statement of Coal Mine Fatalities in the U. S., October, 1916, compiled by Albert H. Fay, Dept. of the Interior, Bureau of Mines. Unillustrated; 32 pp., 6x9 in.

Accidents in Metallurgical Work in the U. S. during the calendar year 1915, compiled by Albert H. Fay, Dept. of the Interior, Bureau of Mines. Unillustrated; 20 pp., 6x9 in.

Vapor Pressures of Various Compounds at Low Temperatures. By G. A. Burrell and I. W. Robertson. Dept. of the Interior, Bureau of Mines. Technical paper 142. Illustrated; 32 pp., 6x9 in.

The Radium-Uranium Ratio in Carnotites. By S. C. Lind and T. S. Whittemore. Dept. of the Interior, Bureau of Mines, Technical Paper 88, Mineral Technology 6. Illustrated; 29 pp., 6x9 in.

Sixth Annual Report of the Director of the Bureau of Mines to the secretary of the Interior for the fiscal year ended June 30, 1916. Dept. of the Interior, Bureau of Mines. Illustrated; 91 pp., 6x9 in.

Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous Coal Mines. By H. H. Clark and C. M. Means. Dept. of the Interior, Bureau of Mines, Technical Paper 138. Unillustrated; 36 pp., 6x9 in.

Industrial News

Clinton, Ind.—The Clinton Coal Co. is equipping three of its mines with heavy automatic safety mine car cagers.

Middlesboro, Ky.—The Thompson Coal Co., with a capital of $1000, has been organized by J. A. Thompson, James Allen and others.

Knoxville, Tenn.—The Union Coal Co. has been incorporated with a capital of $5000 by N. S. Jenkins, Charles Jenkins and E. P. Luttrell.

Praise, Ky.—G. W. Mullins, A. D. Jackson and P. C. Sanders have incorporated the Elkhorn City Coal Co., with a capitalization of $4000.

Hamilton, Ohio—The coal sheds of the Hamilton Otto Coke Co. at Coke Otto, were recently destroyed by fire with a loss of several thousand dollars.

Uniontown, Penn.—Thirty acres of coal in Nicholson Township has been purchased by the Whyel Coke Co. The purchase price was $800 per acre.

Gillespie, Ill.—The Superior Coal Co. has plans to sink another mine near here. The output of this company is taken by the Chicago & Northwestern R.R.

Knoxville, Tenn.—The Oneida Consolidated Coal Co., with a capital of $65,000, has been incorporated by R. Y. Davis, A. H. McIntyre, E. C. Moore and others.

Indiana, Penn.—Robert E. Young, of Indiana, has purchased the property of the McHenry estate near Indiana. It is proposed to open a mine on the property at once.

Harlan, Ky.—The Kitts Creek Coal Co., with a capital stock of $1000 has been incorporated by G. E. Sanders, Emmet Howard and J. R. Howard. The company will develop a mine.

Athens, Ohio—Five hundred acres of land at Clifton, W. Va., have been purchased by Charleston capitalists and plans have been formulated for a coal tipple, salt works and electric power plant.

Warnock, Ohio—The Mining Safety Device Co. of Bowerston, Ohio, recently installed a set of automatic safety mine car cagers for the Youghiogheny & Ohio Coal Co. at the Eleanor mine.

Knoxville, Tenn.—The Blue Diamond Coal Co., of Knoxville, Alexander Bonnyman, president, has recently increased its capital from $150,000 to $200,000 and is formulating plans for extending its operations.

Dennison, Ohio—The Thomas Coal Co. has been incorporated with a capital of $10,000, to mine and sell coal. The incorporators are, F. O. Culley, John A. Fouts, R. A. Wilson, H. J. Andrews and Harry G. Whitaker.

Johnstown, Penn.—The Homer City Coal Co. has begun the erection of a plant at Homer City. It will manufacture and repair its own equipment. An electric hoist is being installed and other improvements will be made.

Dayton, Ohio—The Burnwell Mining Co. has been incorporated with a capital of $10,000, to mine and sell coal. The incorporators are, Charles F. Dunn, S. B. Chilton, Harold L. Snyder, Frank Tossey and H. C. Allread.

Irondale, Ohio—The Yellow Creek Coal and Clay Co. has been incorporated with a capital of $25,000 to mine and sell coal. The incorporators are, Marion Peters, William E. Parsons, Emmett J. Gaston and James L. Parsons.

Garrett, Ky.—The Standard-Elkhorn Coal Co. has been organized here with $50,000 capital

stock by A. J. Johnson, M. M. Collins, George Kone, George B. Martin and others and will develop property known as the Collins tract.

Dover, Del.—The Atlas Coal and Iron Co., of Chicago, Ill., has been incorporated with a capital of $2,000,000, to acquire and develop coal and iron properties. W. C. Florain and Glenn Thompson, Chicago, are among the incorporators.

Johnstown, Penn.—The Midvale Steel and Ordnance Co. have placed orders for 1000 steel hopper cars to complete the equipment necessary for the operation of mines recently purchased from the Pittsburgh-Westmoreland Coal Co.

Bruceville, Ind.—The Oliphant-Johnson mine has resumed operations after the recent explosion. During the recent past it installed a set of automatic safety mine car cagers, made by the Mining Safety Device Co. of Bowerston, Ohio.

Whitesburg, Ky.—The Letcher County Coal Corporation, recently organized at Richmond, Va., by Lucius F. Care and others with $700,000 capital, has purchased an extensive area of coal and timber land in the western part of Letcher County.

Toledo, Ohio—The Eastmand Coal and Development Co. has been incorporated with a capital of $10,000 to mine and sell coal. The incorporators are, Frank Kayser, John H. O'Leary, Fred. A. Rich, Blanche O'Brien and Paul T. Gaynor.

Charleston, W. Va.—It is estimated that in West Virginia there are 1,969,000 acres of coal land of an average value of $33 an acre, making a total valuation of $65,777. These figures were compiled by the office of the state tax commissioner.

Martins Ferry, Ohio—The Pursglove-Maher Co. will shortly erect a temporary tipple at the new mine at Willow Grove between St. Clairsville and Neffs. This company has already built a stable and is doing other preparatory work toward the opening of the mine.

Williamson, W. Va.—The United Thacker Coal and Coke Co. is making tests of coal on a 75,000-acre boundary in this vicinity, with a view to beginning operations. Three workable seams lie on the tract, which is in Mingo County. The acreage is valued at $15,000,000.

McAlester, Okla.—The Craig Coal Mining Co. has been organized here with a capital of $25,000. The incorporators are: A. W. Breckenridge, B. E. Clark and R. E. Jones, all of McAlester. The company owns considerable coal lands in Noble County which it will develop.

Johnstown, Penn.—A mortgage and deed indicating the transfer of several million dollars worth of coal lands in Cambria, Indiana and Blair counties was recently filed in Ebensburg. The deed is from the Tunnel Coaling Co. to the Inland Coal Co. The mortgage is for $2,000,000.

Chicago, Ill.—The Cottonwood Coal Co. of St. Paul, Minn., recently purchased through Roberts & Schaefer, an equipment of automatic safety mine car cagers for its new, four-compartment shaft at Lehigh, Mont. These were built by the Automatic Safety Device Co., of Bowerston, Ohio.

Pittsburgh, Penn.—During January the amount of coal hauled by the Pennsylvania Railroad Co.'s lines east of Pittsburgh and Erie declined 323,217 short tons as compared with January of 1916. The amount of traffic was as follows: Anthracite, 982,249 tons; Bituminous, 4,259,039 tons; Coke, 1,078,900 tons.

Hazard, Ky.—S. L. Bastin, general manager of the Elkhorn Coal Co. at Kona Station, Ky., will have charge of the installation of the new plant for the lately organized Corneva Coal Co. at Chavies, Ky., according to information given out here. The first work—opening mines, etc.—will be started immediately.

Trenton, N. J.—The De Laval Steam Turbine Co., manufacturer of steam turbines and helical reduction gears for all classes of service, centrifugal pumps, centrifugal compressors and similar apparatus, recently announced the opening of a district sales office in the Smith Building, Seattle, Wash. in charge of William Pullen.

Hazard, Ky.—The Williard Coal Co. is being organized here by M. A. Petrey, A. S. Petrey and Maude Petrey. M. A. Petrey is to be manager. This firm will have a capital stock of $50,000. The development of coal properties at Yerkes will be made. It is expected that the initial development will be started soon.

Baker, Ore.—To relieve a serious coal famine which recently existed here, dealers ordered the mines at Rock Springs, Wyo., to send a shipment of coal by parcel post. This order was received and the coal started by mail, but a snowstorm delayed the mail train. The postage on coal from Rock Springs to Baker is $83 per ton.

Youngstown, Ohio—J. G. Butler, Jr., who is said to be acting for the Youngstown Sheet and Tube Co., in the purchase of 202 acres of the J. V. Thompson coal lands in Pennsylvania, is awaiting the decision of the Pennsylvania Supreme Court on the sale. If the deal goes through it is understood that 12,000 acres will be bought.

Venice, Ill.—The large concrete coal-storage reservoir here will be finished this spring, as the promoters at the present time have contracts for the storage this spring and summer of at least half of the capacity of the plant, which is 200,000 tons. These contracts are with large St. Louis users, and have been placed with a view of insuring them against failure of supply the coming winter.

Huntington, W. Va.—J. W. Heron, chief of the Chesapeake & Ohio allotment commission, has announced that the company has authorized him to begin the development of its coal lands to supply it with fuel, and that an investment of $1,500,000 to $2,000,000 may be made. The company owns lands on New River, Coal River and the Big Sandy. Five mines will be opened on the two former tracts.

Birmingham, Ala.—It is announced that Morris Adler & Co. have purchased from the Pittsburgh Coal Co. at Mobile, six steam tugboats for augmenting the Mobile-Warrior coal fleet. The Adler interests own the Corona Coal and Iron Co. and the Birmingham Fuel Co. and recently took over the entire business of the Pittsburgh Coal Co. at New Orleans.

Whitesburg, Ky.—The W. G. Caudill, R. B. and J. C. Day, S. G. Fairchild, J. N. Thompson, L. W. Fields, W. W. Long and other coal properties immediately surrounding this city have been leased for development the initial work to be started at once. Hazard operators have leased the bulk of the properties and have engineers now doing the preliminary work. At least two distinct operations will be made.

Greensburg, Penn.—A check for $2,385,491.75 was recently delivered to E. E. Robbins at Pittsburgh, as part payment for 14,000 acres of coal land in this county, Washington, Greene and Somerset counties. Title to the land was taken in the name of the Union Coal and Coke Co., while the check was signed by W. E. Corey, president of the Midvale Steel and Ordnance Co. and by W. B. Dixon of the National City Bank of New York.

Huntington, W. Va.—The Chesapeake & Ohio Railway Co. has taken an option on two mines on Coal River and may purchase them. These mines are located at Dorothy and Sarita, and are the property of the Four States Coal Co. They would be capable of producing 3000 tons daily. The railroad uses about 7000 tons of fuel per day, and is said to have been unable to secure a price lower than about $3 per ton.

De Soto, Ill.—The mine and property here of the Chicago & Carbondale Coal Co. have been leased for 99 years to H. F. McDonald, Secretary of the Berry-Bergs Coal Co., of St. Louis and associates. The mine at present is producing about 500 tons a day. It has a capacity for 2000 tons. The new operators will spend several thousand dollars and will electrically equip the property so as to produce its capacity tonnage.

Buffalo, N. Y.—A compilation of the Lake ore- and coal-carrying fleet shows 398 vessels, practically all steamers, with a capacity of 3,113,000 gross tons per single trip, or as 20 trips per season, 62,226,000 tons per year. This is a slight increase over last season's carrying capacity, but is likely to be all needed, and rates will be high. Ore carriers commonly go up light some of the time, but most of them could make more than 20 trips in a season.

St. Louis, Mo.—Tonnage movement to and from St. Louis during 1916 increased almost 25 per cent. over the preceding year according to figures compiled by the Merchants Exchange here. This is one of the best and most accurate barometers of the trade conditions in this section. A gross tonnage of 65,975,270 tons is shown as compared with 52,935,016 tons for 1915. Included in the total tonnage received was 9,683,808 tons of coal as compared with 7,972,055 tons in 1915.

Fairmont, W. Va.—B. L. Butcher, commissioner in bankruptcy in the case of the Dakota Coal Co. recently ordered the payment of the final 50 per cent. dividend to creditors of the company. A 50 per cent. dividend was distributed some time ago and the dividend which is now distributed makes settlement in full. In addition to this settlement of claims, a dividend of 45 per cent. has been paid to stockholders of the company. When declared bankrupt last June, there was an indebtedness against the company of $200,000.

Dott, W. Va.—Another important coal deal has been closed whereby the McQuail brothers and others purchased the mines of the Red Raven Coal Co. The price paid has not been announced but it is assumed to be about $100,000 cash. The tract includes about 1500 acres of coal. Present shipments average 600 tons daily. The coal is known to be of a high grade domestic class. The method of advertising this coal in the past has caused favorable comment. There is painted on a large lump of coal on each end of the car a "red raven."

St. Louis, Mo.—Edward Yoch of the International Coal and Mining Co., St. Louis, has purchased from Theodore and Otto Michaelis the Superior coal mine, midway between Belleville and St. Louis, one of the largest producers in the Belleville district. This mine employs 150 men, has a present capacity of 900 tons a day and has been operated seven months without losing a day. The price paid is said to have been $50,000. Theodore Michaelis has been retained as superintendent. The mine will be operated in connection with the Carbon and Taylor mines near O'Fallon, owned by the International company.

St. Louis, Mo.—The Atchison, Topeka & Santa Fe R.R. and the Great Western Consolidated Coal and Oil Co. have leased 5000 acres of coal land between Elmer and Youngstown, in Macon County, Mo. It is planned to extend a coal road northward from Elmer to connect operating shafts with the main line of the Santa Fe and also southeast to Macon to serve the coal fields between Elmer and that town. The headquarters for the coal operations will be at Elmer. The field has been thoroughly prospected. The coal runs from 3½ to 5 ft., in thickness and is said to be of good quality. It is understood that 20 shafts will be sunk.

Birmingham, Ala.—About two hundred members of the Lake Superior Mining Institute will visit the Birmingham District, Mar. 13, 14 and 15, for an inspection of coal and ore mines. The members of the party will be extensively entertained and a special train will be provided for carrying the visitors to the principal industrial plants of the district. Edwin Ball, manager of mines of the Tennessee Coal, Iron and Railroad Co., is chairman of the entertainment committee. Charles T. Fairbairn, manager of the Southern District of the Republic Iron and Steel Co., and several other prominent local mine men are members of the Lake Superior Institute.

Pittsburgh—The committee selected recently by the various examining boards of the bituminous districts is meeting in Pittsburgh this week to formulate and compile the questions to be used at the mine foremen's and firebosses examinations to be held Apr. 10, 11, 12 and 13 in the headquarters of each district. The committee is composed of Mine Inspector Fletcher W. Cunningham of Somerset as chairman, Mine Inspector Thomas S. Lowther of Indiana as secretary, also James Henderson of Dravosburg and James W. Buckwalter as the operators' representatives, and John Walters of Westmoreland City and James Conway of Connellsville as representatives for the miners.

Columbus, Ohio—A coal company, capitalized at $125,000 to operate in the eastern Ohio field has been incorporated at Columbus under the name of the Pan Handle Collieries Co. The incorporators of the new concern are J. W. Blower, D. C. Thomas, E. W. Blower, S. J. Lewis and J. L. Jones. The concern has a property of 700 acres near Steubenville, which is so situated that it can be operated by stripping or by shaft mining. For the present a shaft mine with an initial capacity of 1000 tons daily will be opened. The property is located on the Pennsylvania R.R. J. W. Blower will be president and D. C. Thomas, general manager. Fornand is the name of the shipping point for the output.

Whitesburg, Ky.—The Letcher County Coal Corporation recently organized at Richmond, Va., Lucius F. Carey, president, W. M. Carey, secretary and treasurer, closed during the recent past with the Swift Coal and Timber Co. of this city a deal on somewhat over 60,000 acres of rich coal lands lying along the waters of Rockhouse and Carr's Fork, tributaries of the Kentucky River west of this city in Letcher and Knott Counties. The consideration was said to be unusually large. This was one of the largest coal land deals consummated in eastern Kentucky in several years. It is said that part of the holdings will be opened for development by the purchasers, while much of the other property will be leased for early development. At least two branch lines of the Louisville & Nashville—one up Rockhouse and the other up Carr's Fork will be necessary, the arrangements to be made later.

Philadelphia, Penn.—On Feb. 28 W. N. Trinkle, special assistant to Attorney General Francis Shunk Brown announced that the five railroads concerned in the famous rate reduction ruling ordered by the Public Service Commission over three years ago had agreed to a compromise. The offer of the railroads was that they would agree to a reduction in the rates of freight to this city of 25c. a ton on the prepared sizes, 15c. on pea and 10c. on the smaller sizes. This arrangement had been brought about through the efforts of Mr. Trinkle who had lately been appointed to expedite action in the case. However, for the time being action looking to the compromise has halted. When it was first announced it was supposed that the consumers of coal would benefit in a reduction of the price to the extent of the rate reduction, but upon hearing that a number of dealers had stated that they did not expect to reduce the price of coal, alleging that they were already working on too small a margin of profit, the proceedings have been held in abeyance. It was planned to have the change in rates become effective on Apr. 1, but it is now understood the matter will be postponed a few days in order to give the attorneys for the state time to devise some method whereby they can compel the dealers to give the public the benefit of the reduction.

Market Department

GENERAL REVIEW

Remarkable pre-April situation in the anthracite market. Bituminous trade rounds out the biggest season in its history in brilliant form. Warmer weather and withdrawal of some buyers causes a slowing down in the Pittsburgh district. Middle Western consumers still hard pressed for supplies.

Anthracite—A remarkable situation prevails in the hard-coal trade. Ordinarily, this is a season of the year when the regular anthracite circulars are being freely slashed, with demand down to an irreducible minimum, companies putting in restricted working schedules and a general apathy prevails. But in spite of this established precedent the market has seldom been stronger. It seems highly improbable that any discount on the circulars will be made, at least on Apr. 1, the customary time; as a result of this, together with the very obvious scarcity of supplies and the fact that storage reserves accumulated over the past several years have been cleaned up entirely, consumers are buying with greater assurance. Thus, instead of the usual heavy cutting of the circular, characteristic of the pre-April market, anthracite coal is generally commanding substantial premiums. It is true that, with the advancing season, there is an absence of the very urgent buying of a few weeks ago.

Bituminous—Never before has the coal trade rounded out the season's business in more brilliant form. The heavy storms have accentuated the transportation difficulties occasioned by the heavy congestion of freight on the Atlantic seaboard, and supplies are still desperately short in many instances. There has been some relief occasioned by the very sharp curtailment in the demand for bunker coal, while the consumption has also been limited by restricted operation of industrial plants due to the freight congestion and inadequate car supplies. Dispatch in the coastwise trade is the source of a great deal of anxiety; shippers are constantly harassed by the irregular movement to Tidewater, and some very serious delays in loading have been reported. The railroads are continuing to exert pressure on the operators to obtain supplies; some of the roads have adopted the policy of putting all of their empty cars, on certain days of the week, at mines which load railroad coal exclusively. The very unsettled conditions prevailing in the current market have naturally had a restraining influence on negotiations on new contracts, which are progressing very slowly.

Ohio Valley—The withdrawal of the United States Steel Corporation from the market at the close of last week caused a temporary softening up in the Pittsburgh district, though this was largely overcome by the big snowstorm at the opening of the current week. The very aggressive action taken at a number of points to clear up the congestion sufficient to get the coal through has had beneficial effects and tended to relieve the shortage at these points. The spell of warmer weather last week also slowed down the domestic demands, though with the very urgent demand for steam coal continuing, the operators view this with relief. Contracting is contingent upon so many uncertainties that progress in this direction is slow. Consumers are very adverse to covering at the ruling figures for 12 months, and there is increasing talk of short-term contracts, say three to six months, though these are not in favor with the operators. It seems doubtful at this time if Pittsburgh district operators will be able to maintain the $3 level they have set.

Middle West—The situation was somewhat easier up to the heavy storm that marked the beginning of the current week, the effect of which has not yet become perceptible. Buyers have made some very determined efforts to break the market by coöperating and withholding orders as long as possible, but their efforts have not met with much success. The mild weather of last week was also a very important influence in relieving the urgent pressure for coal, which was gratifying to both buyers and producers. Negotiations are proceeding very slowly on new contracts, due to the abnormal high-price level and uncertainty as to the future. A great many operators are also showing a strong disposition to contract for only a very small percentage of their output. Most of the tonnage left on the upper Lake docks will be applied on contracts, while indications are that the docks will be cleaned up by the middle of the current month.

A Year Ago—Approaching end of the season creates a reactionary tendency in anthracite. Bituminous also quiet with the approach of an agreement at the wage conferences. Large movement on contracts at interior points, but spot market is dull. Contract prices in Middle West higher and current market also stiffer due to colder weather.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Year Ago	Mar. 10	Mar. 3	Feb. 24	Feb. 17	Feb. 10
Clearfields	*$1.35@1.75	$5.90@7.00	$5.60@6.50	$5.15@6.00	$4.85@5.50	$4.60@5.15
Cambrias and Somersets	*1.70@2.10	6.15@7.25	5.90@7.00	5.50@6.25	5.00@5.75	4.85@5.50
Pocah. and New River[1]	2.80@2.85	7.00@7.25	7.00@7.25	7.00@7.25	6.75@7.00	6.50@6.75
Philadelphia						
Georges Creek (Big Vein)	*2.25@2.50	6.50@7.00	6.25@6.50	5.75@6.00	5.50@5.75	5.75@6.00
W. Va. Freeport	*1.40@1.50	6.00@6.25	5.75@6.00	4.75@5.00	4.00@4.50	5.00@5.15
Fairmont Gas mine-run	*1.40@1.50	6.25@6.50	6.25@6.50	5.25@5.50	5.00@5.25	5.25@5.50
Pittsburgh (steam coal)[2]						
Mine-run	1.25@1.30	5.00@5.05	5.25@5.50	5.25@5.50	5.25@5.50	4.95@5.05
¼-in.	1.35@1.40	5.00@5.05	5.25@5.50	5.25@5.50	5.25@5.50	4.95@5.05
Slack	1.15@1.20	4.75@5.00	5.00@5.25	5.00@5.25	5.00@5.25	4.70@4.80
Chicago (Williamson and Franklin Co.)[2]						
Lump	1.60@1.75	3.75@4.00	3.25@3.50	3.75@4.00	3.50@3.75	3.75@4.00
Mine-run	†1.20@1.25	3.50@3.75	3.00@3.25	3.50@3.75	3.00@3.50	3.00@3.25
Screenings	† .95@1.00	3.00@3.25	2.75@3.00	3.25@3.50	3.00@3.25	3.00@3.25
Gross average[3]	*$1.53@1.68	$5.36@5.61	$5.10@5.48	$4.95@5.29	$4.67@5.04	$4.70@4.95

[1] F.o.b. Norfolk and Newport News. [2] Per net ton. [3] The highest average price made last year was $4.80@5.33 made on Nov. 25.
* Price lower than the week before. † Price higher than the previous week.

BUSINESS OPINIONS

Iron Age—Facing the possible Government preemption of space in mills, after suffering curtailment of output amounting to perhaps 30 per cent. as an estimated average, both pig iron and finished steel are sensitive to even expected buying of consumers. In some lines inability to supply export orders serves to reduce unwelcome high pressure on mill operations.

American Wool and Cotton Reporter—The feeling in the trade is strong that cotton will reach 25c. and possibly 30c. and that speculation on the short side is dangerous. There has been very little buying by the mills, although a little demand has come from those in New England, including one or two in New Bedford and some in Connecticut. The woollen goods market continues strong. With prices at present levels and with buying largely over it is not expected that it will be all active.

Bradstreet—Trade as well as industry turned into March at an active gait, accompanied, nevertheless, by such restrictive influences as high prices, railroad embargoes, poor country roads, and a tense international political situation. New financing exhibits signs of uncertainty, and fresh buying in regular trade channels discloses caution as regards far-off commitments. Yet house trade and orders sent in by road salesmen—spring trade in fact—exceeds a year ago, when currents were running rapidly. Scarcity of staple goods, either because of railway congestion or of underproduction, is marked and renders it difficult for jobbers to fill orders. Retail trade is opening well, and an early spring being expected, heavy trade is likely, as labor is well employed at record wages. Dividend payments are larger and money is abundant in the hands of the public.

Dunn—Notwithstanding the uncertainty and caution engendered by foreign conditions, and the restraining influence of exceptional prices, general business is of unequaled dimensions for the period. With forward wants largely covered, many interests are waiting and future demands are less extensive than recently, but the financial markets are undisturbed by the international contingencies and there is no impairment of confidence in the stability of trade and industry. Commercial failures this week in the United States, are 337, against 267 last week, 276 the preceding week and 380 the corresponding week last year.

Marshall Field & Co.—Current wholesale shipments of dry goods are well ahead of the corresponding period a year ago. Road sales for immediate delivery are about equal to the same period last year, while road sales for Spring and Fall delivery show a marked increase over the same week of 1916. Customers have been in to market in about equal numbers. Collections are largely in excess of the same week a year ago.

Dry Goods Economist—Operators on a large scale who, necessarily, place contracts months ahead of delivery, showed a decidedly halting attitude even before the news of Germany's efforts to bring Japan and Mexico into an alliance against the United States. Unwillingness to commit themselves was equally clear this week on the part of large manufacturers and printers. On the other hand, the almost complete withdrawal of buyers of women's garments is attributed not to war prospects, but to the plete withdrawal of buyers of women's garments is attributed not to war prospects, but to the unusual extent of their early buying. In various other lines in which purchases are made for more or less prompt delivery there has been a very considerable movement. Up to this writing the probable effects of war on the country's trade is receiving little consideration.

Contract Prices

Baltimore—Contracts are being concluded here on the basis of $3.50 to $4, as compared with $1.50 last year.

Cincinnati—Operators are in full control of the market, while consuming interests appreciate that conditions are growing steadily less favorable for them and are pushing for contracts.

Boston—The largest proportion of the New England tonnage has been covered with the same interests as usual, but at record prices, a few good-size contracts for steamer delivery being taken at $7.50 alongside. Business is at a standstill at the moment, the impossibility of arranging for transportation having stopped negotiations for the time being.

New York—Bituminous contracting is apparently at a standstill for the time being. On an anthracite contract involving 10,000 tons of buckwheat No. 1, the buyer refused to meet the figure of $2.75 at the mines. Prices named on rice coal vary from $2 to $2.50, and on barley, $1.50 to $1.75, both representing a very considerable increase over last year's figures.

Birmingham, Ala.—The Southern Ry. has closed contracts involving 1¼ million tons for delivery during the 16 months beginning Mar. 1 at approximately $2 per ton at the mines, which compares with $1.10 to $1.25 per ton on old contracts.

Philadelphia—Bituminous interests show very little inclination at present to close contracts, as the tendency of the moment is to go into the market with as much free coal as possible. Some business which had been pending was closed at from $3.25@3.50. On the anthracite steam sizes there has been very little contracting of late. Most of the business that has been closed has been on the part of the smaller shippers at prices around $2.50 and $3 for No. 1 buckwheat. It is also known that some of the larger companies have closed broken coal contracts around $4.25.

Chicago—Contracting is proceeding very slowly, but the Middle Western railroads are showing a disposition to increase their contract tonnages very considerably. Operators on the other hand are inclined to withhold considerable tonnage for the spot market.

St. Louis—A contract for 200,000 tons of Standard screening has been concluded at about $1.25 per ton at the mine, and there has been a railroad contract providing for 35 cars of mine-run coal per week, to run for one year, at $1.40 per ton at the mine.

Atlantic Seaboard

BOSTON

Hampton Roads situation without material change, except for gradual trend toward lighter receipts. Spot prices on Pennsylvania grades at new high levels. Anthracite deliveries still slow. Renewed anxiety here because of blizzard.

Bituminous—With car supply on the Virginia roads still hovering around 60%, receipts at Tidewater continue light. The agencies are maintaining their cautious attitude with regard to accepting boats, and plans for steamer loading are made so far ahead that applications from transients get scant consideration from most of the shippers. Dispatch continues fair, but this is only because the agencies are declining to accept any but boats that were arranged for weeks in advance.

Practically nothing is now heard on the subject of contracts. Quite a volume of coal remains to be purchased by some large consumers and dealers, but it is next to useless to buy coal f.o.b. loading port unless boats can be arranged for. The largest proportion of New England's tonnage has been closed, however, almost uniformly with the same interests who had the contracts last season, but at record prices. A few good-sized contracts for steamer delivery have been taken at $7.50 alongside.

Georges Creek is not a factor in the market. No prices are quoted by the principal shippers and only dribbling amounts are coming forward.

The steam grades from Pennsylvania are in strong demand all-rail for delivery ten to thirty days hence. Prices advanced notably on some grades during the week, in excess of $7 f.o.b. mines being paid for prompt shipment. Coals from the Pittsburgh region are being quoted frequently, and a fair tonnage is coming forward.

Several of the railroads are so short of fuel that certain days each week all their cars are placed almost exclusively at mines having railroad contracts. This operates seriously against commercial coal in several districts.

The scarcity of boats is also affecting the receipts by water. Less spot coal is offering, and it gets increasingly difficult to arrange for cargoes. Congestion at the piers in Philadelphia and New York alternate with pronounced shortages.

Boston retail dealers are still operating on a hand-to-mouth basis on steam coal. Prices are continued at $8 per ton of 2000 lb., but an advance is likely to be announced soon.

High-volatile coal by water from West Virginia recently sold at $10.50 on cars Boston.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. and Somerset
Philadelphia	$7.00@ 8.00	$7.35@ 8.25
New York	7.30@ 8.15	7.60@ 8.35
F.o.b. mines	5.90@ 7.00	6.15@ 7.25
Alongside Boston (water coal)	11.50@11.75	11.75@12.00

Pocahontas and New River are quoted at $7@7.25 f.o.b. Norfolk and Newport News, Va., for spot coal, and $14@15 on cars Boston and Providence for inland delivery.

Anthracite—What, if followed up with regularity, would be a fair supply of domestic sizes arrived one day last week and helped out the local situation to quite an extent. With the storm early this week, however, the retailers were again on the ragged edge. No broken worth mentioning has been on hand for several weeks, and egg also is in very short supply. Pea was advanced by Boston dealers lately from $7.50 to $8.50 per net ton delivered, it now being only $1 less than egg, stove, and chestnut.

Tows are again moving very slowly and coal is short at the piers. Neither New York nor Philadelphia shippers are able to catch up on their orders. Nothing yet is heard about April prices. The trade in this territory is indifferent to the subject and will continue so until the dealers can get enough to supply their insistent customers.

The steam sizes are next to impossible to get in any quantity, so great is the demand nearer the mines. Today no price at all can be had on buckwheat or rice sizes.

NEW YORK

Anthracite buyers waiting for summer prices, but no discount expected. Pier stocks short, with demand steady and prices firm. Bituminous market tightens. Railroads and contract holders buy heavily, leaving small stocks of free coals.

Anthracite—Demand is steady and stocks are light. Most of the collieries are working only 6 to 7 hr. daily, due to the car shortage.

Dealers are anxiously awaiting word regarding the usual spring reduction. In the meantime they are buying carefully and looking for bargains. The market is standing up well at a time of the year when it usually weakens. There was a slight flurry in demand following this week's storm, but no stiffening of quotations for independent coals.

Loading at the piers is slow. Boatmen in many instances are holding out for higher rates and are keeping their boats idle rather than accept a lower figure. As a result loaded boats are in good demand. Dealers who need coal are complaining because of this delay.

Chestnut is largest in supply. The steam sizes remain scarce. Prices for independent buckwheat No. 1 are nearly as high as for most grades of bituminous. Some small contracts for this coal were closed during the week at prices ranging from $2.75 to $3 at the mines. An offer of 10,000 tons at $2.75 it is understood is being held up, the prospective buyer hoping to get a lower figure. The new contract figures for rice are understood to vary from $2 to $2.50, and for barley $1.50 to $1.75, a considerable advance over last year's prices.

Current quotations per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$4.95	
Egg	5.45	$7.00@7.50
Stove	5.70	7.00@7.50
Nut	5.75	7.00@7.50
Pea	4.00	6.75@7.25
Buck	2.75	6.50@6.75
Rice	2.20	4.50@5.25
Barley	1.95	4.00@4.25
Boiler	2.20	3.50@3.75

Quotations at the upper ports are generally 5c. higher.

Bituminous—Market conditions show a tendency to tighten. Demand is steady and there are small stocks available. Car supply shows no improvement and if it were not for the let-up in the demand for bunker supplies and the reduced requirements of certain industrial plants that have suspended operations owing to labor troubles, it is doubtful if there would be enough coal here to go around.

Receipts at the New York Tidewater declined this week due to the heavy snow storms which interfered with transportation. Loading was also slow, due to the scarcity of boats and frozen coal. Considerable coal continues to be taken by the railroads, which have practically cleaned up their storage piles. Bunker demands are quiet. Comparison with ordinary conditions show fewer ships leaving here and many of those sailing are delayed by the nondelivery of coal.

Contracting is nearly at a standstill owing to the uncertain outlook as to future requirements, and operators are also exercising care in booking new business.

Even with the apparent lack of coal, loaded boats in a few instances were delivered alongside at current pier prices by shippers who wanted to prevent extra charges.

Current quotations per gross ton, f.o.b. Tidewater, for various grades are as follows:

	Port Reading	South Amboy	Mine Price
George Crk.			
Big Vein	$8.00@8.25	$8.00@8.25	$6.50@7.00
Tyson	7.75@8.00	7.75@8.00	6.00@6.25
Clearfield	7.75@8.00	7.75@8.00	6.25@6.50
South Frk	7.75@8.00	7.75@8.00	6.25@6.50
Nanty Glo	7.75@8.00	7.75@8.00	6.25@6.50
Som'r. Co	7.75@8.00	7.75@8.00	5.75@6.00
Que'ho'ing	7.75@8.00	7.75@8.00	6.00@6.25
W. Va. Fa'rm't			
Th'r'qua	7.75@8.00	7.75@8.00	5.75@6.00
Mine-run	7.75@8.00	7.75@8.00	5.50@5.75
West. Md.	7.40@7.50	7.40@7.50	5.25@5.50

BALTIMORE

Better car supply and movement, but market remains strong. Stiff contracts being written due to increased mining costs.

Bituminous—With a more liberal car supply, especially in the Somerset region, there has been more coal arrived at the terminals here. This has been readily absorbed, although there is no rush for coal, even big plants being willing to operate with only fuel enough for immediate needs. This will probably continue until April when new contract deliveries will start.

The views of producers as to contracts are constantly stiffening. Many contracts for the year from Apr. 1 are now being made at from $3.50 to $4 as compared with $1.50 last year. With such a market there is little expectation of a decided break in spot prices this summer. All the new contracts are written to cover the 10% increase in miners' wages just granted in Somerset, Fairmont and Georges Creek sections, which with shortened days to nine hours, etc., makes an increase of from 20c. to 30c., or an average around 25c. a ton and contracts already written will have the 25c. a ton added.

The spot market here is strong under steady demand for small lots and heavy bunker business. Prices are about as follows, gross ton to the trade, at the mines: Georges Creek Tyson, $6.50; Somerset, South Fork and Clearfield, $6 to $6.25; Quemahoning, $6.25 to $6.50; Freeport, $6; Fairmont gas three-quarter, $5.50; run-of-mine and slack, $5.25 to $5.50.

Anthracite—A sleet and snowstorm of several days duration, followed by a freeze, brought much frozen coal here. The supply ran a little easier from most mine connections. There was not much talk of premiums as the demand was not urgent, and the trade caught up somewhat on the old orders.

Exports—Official figures are still withheld, but it is learned that the export movement the past week totaled around 12,000 tons. Five charters were announced for foreign loading, including the first for Sweden in some weeks. Charter rates remain exceptionally high and bottoms scarce. Coastwise rates too have advanced, $4 being asked to Boston, with $3 now demanded on 12-month charters.

PHILADELPHIA

Anthracite shows slight signs of improvement, but shipments still far behind orders. Freight rate compromise proposed. Steam contracts being closed. Bituminous prices increase. Railroads after big tonnage. Shippers slow to contract.

Anthracite—The strain on the retail dealers is relaxing to some extent. They are still unable to accumulate any stocks but the demands on them are not quite so urgent. With March well under way consumers are no longer so anxious as they were a few weeks ago that there would not be enough coal to go around. However, March is always a heavy coal burning month and with most cellars bare a big tonnage must reach this market to meet the demand.

The largest shipping company continues to carry most of the burden and has done wonderfully well in holding the market together. The shipments of most of the other companies are woefully inadequate and do not improve as the season advances.

The individuals are showing little or no inclination to regain any of their former customers here, which is convincing evidence that other fields are more profitable. There must, however, be some falling off of shipments to outside markets, as recently many offers of premium coal have been made here. Apparently the smaller shippers have already decided that next year will be even more active than the present and they are going to take all possible advantage of the situation. Even the salesmen have been known to boast of the good prices they are getting. Most of the premium prices quoted by the individuals have been around $5.50 for chestnut, $5.40 for stove, with pea at $4, $4.25 and $4.50, the $4 price being quoted for washery coal. Probably the most important individual advance was that of a company shipping a very high grade of coal, this concern having notified its trade by letter that their current prices are as follows: Egg, stove and chestnut, $7. No pea for sale. Buckwheat $5, and boiler $2.25, with no other steam sizes mentioned.

There is no doubt that sales are being made at the premium prices, as we know of retailers who are charging $7 a ton for pea coal to their customers and frankly tell the latter the reason for the advance. Even several of the chronic price cutters have advanced their prices stiffly and $6.50 for pea is now the rule with them. The great proportion of pea coal in the chestnut size may be the principal reason why the former is so short, as a better price is had by mixing it with the nut.

Of the various sizes broken remains out of the market and shippers claim they have no trouble contracting for all they care to make at from $4.15 to $4.25 at the mines. The opinion is growing that the latter will probably be the fixed contract price of the larger companies, as they are known to have already closed some very big contracts at a price slightly lower than this, with concerns who are usually granted a more favorable price than the general run of contract trade. Several recent sales of steamboat coal as a substitute for broken have been made at $6 at mines. Egg and stove show no falling off in demand. Chestnut, as last week, is the easiest of family sizes locally, but has a strong demand from other markets where these three sizes bring a flat price close to $6. Pea remains the most active. No one has even a fair supply and many users of this popular family size are compelled to use chestnut at the big difference in cost.

Steam coals of all sizes continue to be well oversold. While the big companies are quoting a price of $2.50 for transient business, other shippers have no difficulty whatever in getting $4. Many interests are anxiously awaiting the contract price for buckwheat, and it would not be at all surprising if many are not able to get protection at all. This may seem somewhat strange but as reported here frequently for over a month past many of the individuals have already closed contracts at $3 without waiting for the opening of the contract season, and this week one of the big companies has closed with one of the largest industrial plants in the country for more than 100,000 tons of No. 1 buckwheat at a price of $3. Some of the individuals probably regret their haste in closing on this size, as it now looks as if they could do even better in the open market.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.25	$5.40	Buck	$2.50	$3.40
Egg	4.15	5.25	Rice	2.10	3.00
Stove	4.10	5.60	Boiler	1.95	3.15
Nut	4.50	5.55	Barley	1.85	2.05
Pea	2.80	3.70			

Bituminous—With the exception of some of the Fairmont grades the upward price movement continues, although not as rapidly as at first, which was to be expected. The increases ran from 25c. to 50c., while some of the Fairmont coals shaded off 25c. This latter is somewhat difficult to account for, and will have to be considered one of the vagaries of the trade, for it is known that the production in that region has been very much restricted of late. During the middle of the week that portion of the country was visited with a 10-in. snowfall, followed by a destructive storm, all of which hindered rail movement and held up deliveries.

All week the big industrial plants in and about the city have been scurrying to secure additional supplies of coal and all sorts of rumors are afloat, one of which is that the Pennsylvania R.R. has made a contract offer of $2.75 for coal to cover a period of three years. While this cannot be confirmed it is known that the company is making strong efforts to accumulate a larger surplus and have succeeded in getting a number of shippers to devote two and three days a week to their requirements. The fact that the mines have taken rail fuel orders is causing dissatisfaction among contract customers, who feel that this coal should come to them instead of being sold at a lower figure to other interests. However, the mine owners were compelled, it seems, to accept the orders in self-defense in order to receive sufficient cars to keep their mines in operation.

There has been a very heavy demand for slack coal of late, but on account of the poor car supply there is but very little coal being screened.

Those concerns who up to this time had seemed indifferent to contracting at the rates quoted the first of the year displayed considerable eagerness of late to get under cover, but found it very difficult to do so.

The prices per gross ton f.o.b. cars at mines are as follows:

Georges Creek Big Vein	$6.50@7.00
South Fork Miller Vein	6.50@7.00
Clearfield (ordinary)	6.25@6.50
Somerset (ordinary)	6.25@6.50
West Va. Freeport	6.00@6.25
Fairmont gas lump	6.25@6.50
Fairmont gas, mine-run	6.25@6.50
Fairmont gas, slack	5.75@6.00
Fairmont lump, ordinary	5.75@6.00
Fairmont mine-run	5.75@6.00
Fairmont slack	5.75@6.00

HAMPTON ROADS

Hampton Roads dumpings for February less than January. Large fleet barges weather bound last week. Railway movement not improved. Increase in railroad freight rates announced for Apr. 1.

Last week all barges and sailing vessels were held in Hampton Roads on account of unfavorable weather conditions. The only vessels moving have been steamers. There seems to be the usual number of export cargoes moving, information regarding which is being withheld. Movement from the mines does not show any improvement and shippers are harrassed as much as ever trying to dispatch their boats, some serious delays having been reported.

The British Government has refused to allow the Norwegian steamer "Ruth" to proceed to Bergen, Norway, with a cargo of coal loaded here. The owners of the steamer have arranged to have the "Ruth" proceed to New York and discharge the cargo into a steamer of the Norwegian-American Line for forwarding to Norway. It is reported that the schools and public buildings of Norway have been closed on account of the scarcity of coal.

Prices remain about the same, being $7 per gross ton for Pocahontas and New River run-of-mine for export and coastwise shipment, $7.50 per gross ton for bunker coal plus 15c. trimming, $6.50 per net ton for local delivery in carload lots on track. Anthracite $9 per net ton delivered.

The several railways entering Hampton Roads have filed tariffs increasing all coal freight rates to tidewater 10c. per ton effective Apr. 1. In the case of business closed as of Apr. 1, this does not work a hardship on coal shippers, but on bunker business and some other contracts closed the first of the year the increase will have to be borne by the shipper. On bunker business this loss will now amount to 15c. per gross ton, the increased freight rate and 5c. increased trimming rate.

Tonnage dumped by the various railroads during February was as follows in gross tons: Norfolk & Western Ry., 462,927; Virginian Ry., 335,-; Chesapeake & Ohio Ry., 419,535; total, 1,217,854. This is some 100,000 tons less than January, the principal loss being by the Norfolk & Western.

Dumpings at the Hampton Roads piers for the past several weeks were as follows:

	Feb. 10	Feb. 17	Feb. 24	Mar. 3
N. & West...	106,980	114,832	127,765	100,118
C. & Ohio...	44,328	130,752	125,089	122,483
Virginian.....	58,083	77,158	69,014	127,902
Total.....	209,391	322,742	321,868	350,503

Ocean Shipping

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

PHILADELPHIA

Name	Destination	Tons
Graafaxe	Jucaro	
Durley Chine	Halifax	
Com. Rollins	Havana	1,500

OCEAN FREIGHTS

The freight market to nearly all destinations is firmer than a week ago, and although we have chartered a number of steamers for export coal during this period, none of them have been reported.

We would quote freight rates on coal by steamer as follows:

	Feb. 26	Mar. 5
Europe		
West Coast Italy....	$56.40@62.40	$56.40@62.40
Marseilles.....	54.00@58.80	54.00@58.80
Barcelona*[2].....	24.00 about	26.40@28.80
South America		
Montevideo.....	23.40 about	23.40 about
Buenos Aires.....	23.40 about	23.40 about
Rosario.....	25.20@26.40	25.20@26.40
Rio Janeiro.....	[3]19.00 about	[3]20.00 about
Santos.....	[3]20.00 about	[3]20.00 about
Chile (good port)....	14.00@16.00	14.00@16.00
West Indies		
Havana.....	4.75 about	4.75 about
Cardenas, Sagua....	6.50 about	7.00 about
Cienfuegos.....	6.50@ 6.75	7.50 about
Port au Spain.....	10.00 about	10.00 about
St. Lucia.....	10.00 about	10.00 about
St. Thomas.....	8.00@ 9.00	8.00@9.00
Barbados.....	10.00 about	10.00 about
Kingston.....	7.50 about	7.50 about
Curacao[1].....	9.00 about	9.00 about
Santiago.....	6.75 about	6.75 about
Guantanamo.....	6.75 about	6.75 about
Bermuda.....	8.00 about	7.00@8.00
Mexico		
Vera Cruz.....	8.50@ 9.00	8.50@9.00
Tampico.....	8.50@ 9.00	8.50@9.00

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port. [3] Net.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

A few charters of small barges are still being made at $3.25 from Hampton Roads to Long Island Sound, with six and eight days to load and discharge; $4 is asked from Philadelphia to Boston for the same class of tonnage, but no rates are quoted on larger boats or on steamers. Tonnage of all kinds is extremely hard to get for Hampton Roads loading because the inquiry to move other commodities is so great.

One dollar and ninety cents was paid this week on barges from New York to Boston, and $1.35 on the same loading for Providence.

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Com. Rollins	Havana	1,500	
BALTIMORE			
Sir Ernest Cassel	Sweden	3,338	
Polaria	Chile	2,252	
Nordhavet	Santos	2,159	
Peter H. Crowell	Pernambuco	2,423	
Alice May Davenport	River Plate	952	
VIRGINIA			
Robert Scrafton	River Plata	1,680	$20.00
Republic	Para	680	20.00
Chas. T. Maxwell	Para		20.00
Kringsjan	River Plata		20.00
Fredericksborg	Havana		4.50
	Havana	2,500	4.50
Calhoun C. Ross	Bermuda		8.00
NORFOLK			
Protector	Montevideo		20.00
NEW YORK			
Erminie	Bermuda		8.25

Ohio Valley

PITTSBURGH

Market easier but Sunday's snowstorm expected to make coal scarcer. Buyers show distinct aversion to contracting.

At this writing the spot coal market is probably at its low point. Saturday, Feb. 24, the Steel Corporation withdrew from the market. For a day or two the market held up fairly well and then it became softer. Last Sunday there was a big snowstorm, promising very poor car supplies later, but many cars were near at hand and supplies Monday morning were quite good, compared with the average of the past few weeks, resulting in an easy market. Higher prices are expected before the end of the week.

Consumers are still more averse to taking hold on contract coal for the twelvemonth beginning Apr. 1 and it appears that no great tonnage has been sold. There is more talk about the desirability of making contracts for shorter periods, three or six months, but operators thus far have been unwilling. There may be a change in their attitude next month. It seems improbable that even $3 can be established as the regular market for the twelvemonth, although a couple of months ago still higher prices were being talked of.

We quote the spot market at $4.75@5 for slack, $5 for steam mine-run and $5.25 for ¾-in. gas, per net ton at mine, Pittsburgh district, with $3@3.25 asked for steam on contract and $3.25@3.50 for ¾-in. gas.

BUFFALO

Expected break in bituminous did not take place. Big snowstorm complicates the movement. Anthracite doing better, but still scarce.

Bituminous—There was every prospect of a break in prices last week and some shippers were already shading their quotations, particularly in the Clearfield district. Pittsburgh mostly held firm, but Bessemer coal was lower and jobbers were looking for a decided decline. Then the weather turned cold and the little surplus of cars occasioned by the release of those in blockade, gave out and with a scarcity of cars at the mines the market firmed up again. Now follows a severe northeast snowstorm and all prospect of a break is past for the present.

The demand has been rather light for some time, probably with the idea that the past high prices were at an end, but there is not supply enough to shut off buying and the consumer has been obliged to return to former prices. The confiscation of coal in transit has been especially aggravating of late, so that shippers have labored under all sorts of difficulties known to the trade. The small amount of bituminous on track here last week has disappeared, and it is not likely to show again right away. Sellers of bituminous have practically gone out of the contract market. They do not consider the prices offered by consumers as safe to accept and are moreover well enough satisfied with order sales, so long as it is so difficult to fill them. No institutions or city consumers here have as yet asked for bids and it is doubtful if any would be made if they did. Some shippers have been obliged to devote practically their entire output to the filling of orders, made at last spring's low prices. They do not mean to be caught in that way again.

Prices may be given about on a par with last week, f.o.b. cars at Buffalo, net tons, as follows:

Youghiogheny Gas	$6.50@7.00
Pittsburgh Steam	6.25@6.75
Ohio No. 8	6.25@6.75
Allegheny Valley	6.00@6.50
Cambria Co. Smithing	6.20@6.50
Pennsylvania Smokeless	6.15@6.65
All Slack	5.75@6.25
Cannel	5.90@6.40

Anthracite—The demand is still heavy. While it is ready to drop off as soon as the weather shows a disposition to become milder, the cold week just past has forced the consumers to buy liberally. The supply is not good, but the shippers and retailers have managed to keep pretty well ahead of it and they now feel that they will very soon be past the worst of the winter. Consumers and retailers will not buy more than they must, for there is still the possibility of a reduction next month, though at the same time there are rumors to the contrary.

The independent anthracite shippers are still offering quite an amount of coal and in some instances are getting as much as $2 premiums, where prompt delivery in quantity can be promised. Buffalo consumers have not as a rule bought much of this coal, as they have usually been able to get enough from the regular shippers. It is some time since more than a ton or two could be obtained at a time, unless it be for apartment houses or other large consumers. The car shortage in this trade is quite as pronounced as it is anywhere.

There is no prospect of getting any anthracite for loading into Lake vessels before the opening of navigation. Some effort has been made to fix the rates, but as a rule the vessels are asking more than the shippers will pay. It is expected, though, that the rates will be considerably higher than they were last season, as iron ore rates are so much advanced.

TORONTO, CAN.

Anthracite supply improved, but local deliveries slow. Bituminous remains very scarce. Municipal coal yards likely to be established.

Anthracite has been coming forward fairly well latterly, the only difficulty in supplying consumers being in connection with the local delivery, as dealers are much behind in filling orders. The situation as regards bituminous shows little, if

any, change for the better as the receipts are barely sufficient to meet the daily requirements. The railroads claim that they have moved all on their terminals at the border, and that very little is coming forward from the mines. Prices are nominally unchanged.

The shortage that has prevailed this winter will certainly result in many Ontario cities and towns establishing municipal coal yards. A bill is now before the Ontario legislature authorizing municipalities to borrow money in order to deal in fuel and food, and it is practically certain to be adopted.

DETROIT

Movement freer but demands of steam plants leave practically no surplus. Domestic demand is lighter. Lake shippers still seek boats.

Bituminous—Improvement in the transportation situation has followed the clearing of most of the freight congestion off the local tracks. There is a freer movement of bituminous coal into Detroit, but the quantity is not in excess of requirements and practically all the stock is being sold either in transit or immediately after arrival. Prices are holding quite steady. Coal on tracks is quoted at $5 and $5.25, plus the freight, while tonnage in transit is quoted around $4.75 at the mines. No distinction is being made between small and large sizes in the matter of price.

Anthracite—Buying of anthracite is light and shipments are also moving very slowly. Retail dealers are refraining from placing orders, as they fear that coal ordered now might not reach them until after it has become unsaleable because of warm weather. In one case, a car of coal leaving the mines Dec. 1, spent nearly three months en route reaching the consignee a week ago.

Lake Trade—While no contracts for vessel tonnage have been reported recently shippers are still inquiring for boats. It is known that a large tonnage of coal has been placed under contract, including that covered by agreements which extend over a period of years at carrying rates equivalent to whatever may be the going freight rate of each season. Docks at the head of the Lakes are reported nearly empty.

COLUMBUS

Market easier and conditions less strenuous. Freight movement better; no serious famine, and prices lower.

The domestic trade is still active, although there is not the stress of the past few weeks. Dealers are taking advantage of the lull to accumulate stocks and be prepared for the few cold snaps, which are usual during March. Retail prices have shown no recession from the high levels of the previous week. Pocahontas is still selling around $7 and even higher while Hocking lump is firm at $6.25.

Steam business has been exceedingly active, but the shortage of steam grades is not as marked as formerly. This is due largely to the fact that the Utilities Commission investigation corrected some of the faults of the traffic departments of railroads. Production has increased to a marked degree during the past week.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4 25	$4 75	
Inch and a quarter	4 25	4 75	$4 75
Three-quarter inch	4 25	4 50	4 50
Nut	4 25	4 50	4 50
Egg	4 00	4 50	
Mine run	4 00	4 25	4 25
Nut, pea and slack	3 75	4 25	4 25
Course slack	3 75	4 25	4 25

CINCINNATI

Severe weather has added strength to the market, and heavy snows are further hampering transportation. Operators in firm control.

A period of severe weather, has given increased and unneeded strength to the market, resulting in demands on the retail trade which dealers have had difficulty in meeting. Heavy snows fell for three days, and while extremely low temperatures were not experienced, the need for fuel for heating was as heavy as at any time during the entire winter. Industrial demands have shown no indication of slackening, as operations in most quarters are on an increasing rather than a decreasing scale.

Prospects are that the trade is to witness little weakening in any department of the market for some time to come. Operators realize that the market is at their mercy, and large consumers are finding that conditions for contracting are becoming less favorable to the buyer; hence pressure to contract is increasing from the buying side, and contracts closed are at record figures for all time.

LOUISVILLE

Market firm and demand heavy in spite of advancing season. Small improvement in car supply.

Somewhat milder temperatures have lessened the demand for domestic coal and the retail trade is returning to more normal channels. The heavy demand for steam coals, however, is holding prices up and steam sizes are virtually on a level with domestic. Memory of recent shortages and shut-downs is believed to be influencing the industrial consumers to stock at this time. The car supply has shown little, if any, improvement, although there is an easier feeling and a prospective agreement between the Louisville & Nashville and eastern Kentucky operators is tending to relieve a tension that has existed for some time. Western Kentucky is quoting steam coals only occasionally.

Prices, f.o.b. the mines, range in eastern Kentucky: Block, $4.25@4.50; mine-run, $4.25@4.50; nut and slack, $4.50. Western Kentucky lump, $2.50@3; nut and slack, $1.50@1.60, and pea and slack, $1.10. Contracts for delivery during the Lake season are reported to be pending at $2.50 and $2.25@2.50. Western Kentucky operators report no contracts being signed at this time.

BIRMINGHAM

Inquiries less urgent but demand still fair and more in line with supply. Incessant rains have flooded many mines and shortage of cars is greatly decreasing the production.

A slight easing off in inquiries is reported though ample business is still being offered to more than absorb the available supply of free coal. The heavy rains have partially flooded many operations, and the car shortage has resulted in a greatly reduced output.

The Southern Railway closed contracts recently for approximately a million and a quarter tons of Walker County coal for delivery during the sixteen months from Mar. 1, 1917 to July 1, 1918, at a figure near the $2 per ton mark at mines. The roads contract did not expire until July 1, 1917, and the negotiation of a new contract at this time strengthens the opinion that railroad fuel contracts this year will be not less than $2 per net ton. Old contract prices range from $1.10 to $1.25 per net ton mines. Spot steam prices are about as follows per net ton mines: Big Seam mine-run, $2.50@3; Carbon Hill, $2.75@3; Pratt and Black Creek, $3.25@3.50; Cahaba, $3.00@3.50.

There is practically no domestic demand but producers are holding up schedule prices, which are as follows per net ton mines: Big Seam Lump, $3; Carbon Hill, $3.50; Cahaba and Black Creek, $4, and Montevallo, $4.25.

Coke

CONNELLSVILLE

Spot coke down and up again. Offerings of foundry coke on contract. Production and shipments increased.

The spot coke market declined sharply in the closing days of last week, spot furnace selling down to $10 and spot foundry down to $12.50. In several instances $15 net from dealers had been secured for spot foundry coke, making a new high record price on this movement. The big snowstorm on Sunday did not come soon enough to shut off cars for Monday morning, when there was realy a rather fair supply; the expectations of very poor car supplies for the remainder of the week, had stiffened the market, as high as $12.50 being secured Monday afternoon for spot furnace coke.

There is no interest in contract furnace coke. Some operators would possibly sell at $6 for the second half. There has been considerable offering of foundry coke for the second half of the year. Two operators at least quoted $6.50 to a few consumers, in some instances apparently for the purpose of getting them away from their regular source of supply, but asking prices were shortly advanced to $7. Most operators refuse to quote for the period. The balance of this half year remains nominally at $8.50, done some time ago.

We quote: Spot furnace, $12@12.50; spot foundry, $13.50@14.50; contract furnace, $6@8; contract foundry, $7@8.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 24 at 353,461 tons, an increase of 46,837 tons, and shipments at 353,085 tons, an increase of 63,311 tons.

Buffalo—Prices are as strong as ever. Consumers are never able to get any amount of stock ahead and feel that they must pay the asking prices or shut down. All prices are about the same, based on $13 for foundry at the Connellsville ovens, which makes the Buffalo price $14.85.

Chicago—Continued car shortages, inability to get normal supply of coal, and heavy demands on the ovens prevent any relaxation in the coke market here. Spot sales are nil, and a free shipment now and then available easily brings $12 to $13 per ton.

Birmingham, Ala.—High-grade spot foundry coke was firm at $12 per net ton ovens this week, with strong inquiry. The very inclement weather which has prevailed from the beginning of the year has held down the production far below normal. Contract business is of small volume, prices ranging from $8.50 to $10 per net ton ovens. A large number of contracts will expire July 1, at which time the larger coke consumers will feel their first serious effects of the stiffened prices.

Middle Western

GENERAL REVIEW

Spot market easier in places but unfilled orders keep prices strong. Buying less brisk. Eastern coals still very tight.

Prices generally are about the same as a week ago. Warmer weather conditions have been in favor of consumers, which is more than satisfactory to most of the operators and carriers since they have been unable to meet the recent heavy demands. It is increasingly apparent that the difficulties of the railroads are due to shortage of motive power and inability to keep it in proper repair. Delivery to retail yards is more satisfactory, although arrivals are small.

Railroad fuel contracts are attracting considerable attention from Indiana and Illinois operators. All signs point toward the operators being able to obtain much higher prices from the carriers, particularly since Eastern coals are being held at relatively higher prices. Western carriers are showing a disposition to increase their contract tonnages and railroad buying in the open market recently has been very heavy. An unprecedented amount of Illinois and Indiana coal will be placed in storage this spring by Western railroads. Public service corporations are also making extensive plans to store larger quantities of coal than ever before.

Contracting does not show the usual activity for this time of year. Southern Illinois operators are very slow to obligate themselves, and it is reported will not contract any of their output for next year, preferring to stay in the open market. Efforts have been made during the past week by large users of Springfield coal to break prices, but with little success. The method was to withhold orders in unison for a time hoping that an accumulation of spot coal would occur with consequent drop in prices, but the tonnage affected in this manner was of little moment.

While domestic ordering has been less, prices are maintained at previous levels. Screenings are as strong as ever, and it is predicted that fine coal will not be found below $3 during this month.

ST. LOUIS

Car supply better and market easier. Demand falling off slightly, though steam grades are holding up better. No anthracite or smokeless obtainable.

The mines have had a better supply of cars than for the past three weeks. In the Standard field some roads were cut short, but as a whole the situation has been better. The high grade field worked at about 80 per cent. capacity as against 84 per cent. the week previous and 77 per cent the week before that. Car supply in the Williamson and Franklin field is better, but the railroads are taking a large proportion of the tonnage.

The demand is off on domestic from both the country and the city, while the steam call seems to be about normal. Chicago has been buying some in this market. Prices are steady on all sizes in the high grade field and this will likely continue. In the Mt. Olive and Standard field the demand is spasmodic and when the northern market is shut off, together with the railroad demand, there will be a surplus tonnage that may bring these prices down.

Anthracite is almost out of the market entirely, and there is no smokeless coming in. Smokeless for shipment from Apr. 1 to Sept. 1, is offered for mine-run, egg and lump at $4 mines with a $2.50 freight rate, making it $6.50 per net ton f.o.b. tracks St. Louis, which means $8 to the consumer.

The number of available freight cars increased about 30 per cent. the past week over the three weeks preceding, while the supply of coal cars was from 10 to 14 per cent. better.

The L. & N. have been ordered by the Interstate Commerce Commission to accept billing on car shipments from every mine to all points where through rates are in effect. In order to discourage reconsignments at East St. Louis, this road has a ruling that reconsignments must be delivered to the freight agent at East St. Louis, which is an arbitrary ruling and will be contested before the commission. All the other roads seem to be trying to coöperate with the shipper and consignees.

Contract proposition is being handled very cautiously. During the past week approximately 200,000 tons of Standard screenings were contracted for at about $1.25 the mines. Some of this was for East St. Louis with a rate of 37½c., and the larger portion for St. Louis with a rate of 57½c. One railroad contract made last week was for 35 cars of mine-run per week, equipment furnished, for one year at $1.40, the mines.

Several contracts are being figured on, but the advanced price is causing the consumer to take into consideration the delivered values of the coals from the three principal shipping fields, and several changes will be made.

Prices quoted from the operators in the central Illinois field which includes a section of the Mt. Olive and Staunton field show that the average prices asked on contracts for steam business are $2.25 on lump, $2 on mine-run and $1.75 on screenings. Quotations on Williamson County

coal for steam business for a year were $2.25 on steam lump, $2 on mine-run and $2 on screenings. Short time contracts for March, April, May and June, bring quotations of $2.50 on mine-run and $2.75 on screenings, with other sizes offered at open market prices only.

At the present time it is impossible to secure a domestic contract from operators in either the Standard, Mt. Olive or high grade field, unless the dealer agrees to take the same tonnage throughout the summer months as he does in the winter months, or within 25% of his winter requirements.

Prices f.o.b. St. Louis per net ton are about 25c. under the outside market and are:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6-in. lump	$3.00@3.25	$2.85	$2.50
3x6-in. egg	3.00@3.25	2.85	2.50
2x3-in. nut	3.00@3.25	2.75	2.35
No. 2 nut	3.00@3.25	2.50	2.35
No. 3 nut	3.00@3.25	.....	.....
No. 4 nut	3.00	.....	.....
No. 5 nut	2.50	.....	.....
2-in. screen.	2.50@2.75	2.25	1.90@2.10
2-in. lump	.....	.....	1.90@2.25
3-in. lump	.....	2.75	.....
Steam egg	3.00@3.25	2.75	1.90@2.00
Mine run	2.75@3.00	2.25	1.50@1.75
Washed			
No. 1	3.25	2.85	.....
No. 2	3.25	2.75	.....
No. 3	3.25	2.75	.....
No. 4	3.00	2.50	.....
No. 5	2.50	2.00	.....

Rate on Williamson and Franklin Co. is 72½c.; rate on other fields is 57½c.

CHICAGO

Buying slightly easier in some cases. Prices still very stiff. Screenings strong. Supply of anthracite and Eastern coals very limited.

The call for shipments from Williamson and Franklin Counties in the Chicago market is somewhat lighter this week, but the demand from the Northwestern states and other interior districts has been very strong so that prices are unchanged. Little spot coal has been available, but efforts have been made here and there to obtain concessions. No free coal has been shipped from Saline County. The Harrisburg district has suffered more than others in the way of car supply.

The Springfield situation has been a mixed one during the week. Efforts by large users to produce a bearish effect on prices have met with little success, mainly because the car supply was short.

The demand from interior points for central Illinois coals was strong, while spot shipments for the Chicago district showed some weakness at times. No change has occurred in the price situation of the northern Illinois group. Some little softening has been apparent in steam sizes, but domestic trade is still strong at high figures.

Receipts of Indiana coal in the Chicago market have been less than usual as the operators could obtain better prices at home. Knox County reports a heavy booking of new orders. Very little Eastern coal is coming into Indiana.

The tonnage of smokeless coal available for spot delivery has been extremely small, although more contract shipments have arrived. A few shipments of Pennsylvania smokeless have arrived in box cars.

Hocking shipments have been nil and splint arrivals light, with prices well held. While car supply in Kentucky is reported a trifle easier, receipts here continue light owing to transportation difficulties. Prices for all Kentucky grades are very strong.

The anthracite situation in the Chicago district and at Western points is as tight as ever. Tonnage is very scarce, and the little amount available is offered at fancy figures. Retailers are short of certain sizes, and rail shipments from the mines are still most uncertain. Price is of little consideration, and the ability to get tonnage is the controlling factor.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$2.50@3.00	$3.25@3.50	$3.50@3.75	$3.50@3.75	.....
Steam lump		3.00@3.50	3.00@3.25	.....	.....
Egg	2.50@2.75	3.00@3.25	3.00@3.50	3.50@3.75	.....
Nut	2.50@2.75	2.75@3.00	3.00@3.50	.....	.....
Mine-run	2.35@2.50	2.75@3.00	3.00@3.25	3.25@3.50	.....
Screenings	2.15@2.25	2.50@2.75	3.00@3.25	3.00@3.25	.....

	Wilamson & Franklin Cos.	Saline & Harrisburg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3.75@4.00	$3.75	$5.00	$5.00	Limited arrivals
Egg	3.75@4.00	3.75	5.00	5.00	
Nut	.....	3.50@3.75	.....	.....	
No. 1 nut	3.75@4.00	.....	.....	.....	
No. 2 nut	3.75@4.00	.....	.....	.....	
No. 3 nut	3.50@3.75	.....	.....	.....	
No. 1 washed	3.50@3.75	.....	.....	.....	
No. 2 washed	3.50@3.75	.....	.....	.....	
Mine-run	3.50@3.75	3.25@3.50	4.50@4.75	4.50@4.75	
Screenings	3.00@3.25	3.00@3.25	.....	.....	

Hocking Lump $4.25@4.50. Splint Lump $4.25@4.50.

KANSAS CITY

Prices on domestic and steam coal in Kansas City reached a new and lower basis on Mar. 1, lower than coal has been selling for on the market, though higher than last year's list. Demand has slackened, and supplies are keeping up, with production on a sounder basis than for some time.

Prices on coal at the mines in various districts, and the freight quoted in Kansas City Mar. 1, were:

KANSAS COAL

	Price	Freight
Lump and nut	$3.50	$0.90
Mine run	3.00	.90
Nut run	2.75	.90
Mill run	2.50	.75
Slack	2.25	.75

MISSOURI

Lump and nut	$3.25	$0.60
Domestic lump	3.15	.60
Railroad lump	2.75	.60
Mine run	2.50	.60
No. 2 washed nut	3.00	.60
Washed slack	2.50	.60

SEMI-ANTHRACITE

Domestic lump	$3.50	$2.10
Mine run	2.25	2.10
Nut run	1.75	1.45
Slack	1.60	1.45

These prices are an advance on the list of steam grades, and a reduction on domestic, though the actual market on both domestic and steam the past few months has been higher than this. Contract prices are lower than these, but the difference is less than in former years.

General Statistics

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern Coal Operators' Association giving production for August, September and October, 1915-16:

State	August 1915	August 1916	September 1915	September 1916	October 1915	October 1916
Missouri	208,035	236,657	226,524	264,206	256,142	323,068
Kansas	443,950	457,023	519,456	311,551	604,607	578,714
Arkansas	120,758	114,631	139,152	106,818	204,462	122,114
Oklahoma	230,373	197,528	243,053	79,037	244,151	61,880
	1,003,616	1,005,839	1,128,185	761,612	1,309,362	1,085,776

MIDDLE WESTERN ROADS

The following is a comparative statement of coal handled by 17 principal Middle Western carriers for the month of October, and the first ten months of 1915 and 1916:

	October 1915	October 1916	10 Months 1915	10 Months 1916
Illinois Central	881,782	892,347	6,301,086	7,764,392
C. & E. I. R.R.	759,305	733,882	5,166,109	5,970,669
C. B. & Q. R.R.	712,156	962,718	4,677,072	5,862,040
C. C. C. & St. L. R.R.	548,961	541,525	4,188,984	4,341,228
Vandalia R.R.	461,008	556,570	3,964,491	4,251,003
C. T. H. & S. E. Ry.	327,826	411,865	2,520,584	3,187,067
C. & A. Ry.	256,238	247,326	1,647,753	2,023,427
Wabash R.R.	157,775	192,089	1,293,491	1,381,457
St. L. I. M. & L. Ry.	163,988	154,866	1,309,764	1,508,083
Southern Ry.	170,325	170,896	903,248	1,523,782
B. O. S. & W. R.R.	104,026	100,353	820,667	666,014
St. L. T. & E. R.R.	64,199	120,287	502,770	757,435
St. L. & O. F. Ry.	75,763	80,816	530,865	617,168
L. & M. Ry.	58,350	84,546	400,985	1,034,472
C. I. & L. Ry.	64,158	49,484	552,101	612,330
C. P. & St. L. Ry.	60,617	49,758	365,452	406,356
C. & N. W. Ry.	38,352	81,568	334,663	457,748

THE CHESAPEAKE AND OHIO RY.

The following is a comparative statement of coal traffic from New River, Kanawha and Kentucky districts for the month of January, 1917, and 1916:

To	January 1917	January 1916
Tidewater	512,952	500,892
East	273,470	249,632
West	1,185,416	1,302,484
Company's fuel	207,704	184,450
From connections	168,678	189,179
Total	2,348,220	2,426,637
Anthracite	718	1,284
Total	2,348,938	2,427,921

NORFOLK & WESTERN

Destination of shipments over this road for December and the 12 months of 1915 and 1916 ware as follows, in short tons:

Coal	December 1915	December 1916	Twelve Months 1915	Twelve Months 1916
Tidewater				
Foreign	220,434	153,483	3,862,538	3,307,443
Coa'w'se	239,289	227,741	3,188,259	3,373,072
Dom'tic	2,047,159	2,124,096	22,890,141	27,680,401
Coke				
Foreign	7,638	1,993	42,311	48,634
Domestic	113,051	171,755	947,985	1,999,680
Total	2,627,571	2,679,068	30,931,234	36,409,230

I. C. C. Decisions

Investigation and Suspension Docket No. 860. Coal to Brooksville, Ky. Submitted Dec. 2, 1916. Decided Feb. 6, 1917.

Proposed increased rates on coal from mines on the Chesapeake & Ohio Ry. in West Virginia and Kentucky to Brooksville, Ky., found justified in part. Schedules under suspension ordered canceled, but without prejudice to respondents' filing tariff conforming to the findings herein.

Foreign Markets

GREAT BRITAIN

Feb. 22—There has been an increased Government demand, but the market is still very bare of orders. Prices rule round about last figures.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$6.00@6.24
Best dry coals	5.76@6.00
Best Monmouthshires	6.00@6.24
Seconds	5.52@5.76
Best Cardiff smalls	4.08@4.32
Cargo smalls	3.60@3.84

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The scarcity of tonnage continues to be felt severely. To nonlimitation ports, rates are somewhat irregular. Hopes are entertained that the difficulties with regard to neutrals may be overcome.

Gibraltar	$16.80	Port Said	$24.00
Marseilles	21.00	Las Palmas	12.00
Genoa	24.30	St. Vincent	15.60
Naples	23.58	River Plate	16.80
Alexandria	24.60		

The detailed statement of British exports has been discontinued Gross exports for January compare as follows: 1917, 3,488,494; 1916, 3,383,099; 1915, 3,769,598.

SOUTH AFRICA

Coal production of the Union of South Africa for November, in short tons was as follows:

	Production	Sold	Value*
Transvaal	664,098	562,573	130,368
Cape	3,945	3,075	1,777
Orange Free State	81,413	71,548	18,250
Natal	354,444	264,876	95,672
Union of South Africa	1,103,900	902,072	246,067

* English pounds.

Financial Department

Virginia Iron, Coal & Coke Co.

The fourteenth annual report of this company for the year ended June 30, 1916, issued under date of Sept. 7, states, in part, as follows:

Although the year has not been a profitable one, bills payable was reduced $715,867, and we retired by purchase 45 ($38,875) company's first mortgage bonds and 17 ($17,834) Carter Coal and Iron Co. bonds.

Coal mines produced 1,881,240 tons of coal, an increase of 167,420 tons, and coke ovens 288,708 tons of coke, an increase of 176,397 tons. On account of the large increase in coke manufactured out of coal mined, shipments of coal show a decrease of 147,887 tons.

The necessary preliminary work for the installation of an additional colliery in the vicinity of your Linden coal operation is now in progress, and we hope before Jan. 1 the new colliery will be in operation

Permanent additions and improvements made amount to $150,939.

EARNINGS FOR YEAR ENDED JUNE 30

Operation of	Year 1915–16 Gross	Net
Furnaces	$1,906,566	$194,404
Foundries and shops	89,732	def. 1,799
Coal mines	1,587,440	239,232
Coke ovens	530,822	def. 4,466
Saw mills	4	
Grist mills	194,034	9,645
Total	$4,308,598	$437,016

INCOME ACCOUNT FOR JUNE 30 YEARS

	1915–16	1914–15
Net earns. from oper'ns	$437,016	$406,574
Farms and farm rentals	12,166	11,044
Miscell. mdse., dis., etc	41,798	16,398
Total net income	$490,980	$434,016
Deductions—		
Taxes	$64,393	$60,814
Bond interest	256,579	257,760
Insurance	30,335	23,854
Expenses of idle plants	155,865	91,194
Deprec. of active plants	123,172	135,686
Interest and discount	85,342	93,933
Miscellaneous	894	1,040
Development	22,494	14,457
Total deductions	$739,074	$678,738
Loss for the year	$248,094	$244,722

Operating, etc., accounts were charged during the year with $370,977 for depreciation, namely: Depreciation of coal lands, $108,547; depreciation of ore lands, $5,001; depreciation of improvements to leased properties, $51,581; depreciation of improvements to owned properties, $173,404; also with furnace repairs, $32,445.

There was spent $206,099 during the year for additions and improvements to owned and leased properties, namely: Improvements to owned properties, $143,934; improvements to leased properties, $7,005; repairs to furnaces, $55,160.

BALANCE SHEET JUNE 30

Assets—	1916	1915
Real est. and plant	$12,095,730	$12,307,841
Equipment	567,315	492,788
Securities owned	197,363	197,363
Sales ledger balance	708,683	212,453
Bills and accts. rec	120,961	112,296
Cash	117,113	90,737
Materials	1,234,842	2,452,665
Miscellaneous	28,120	34,475
Profit and loss	1,925,862	1,663,596
Total	$16,995,989	$17,564,215
Liabilities—	1916	1915
Capital stock	$10,000,000	$10,000,000
First mtge. bonds	4,735,000	4,780,000
Prior lien bonds	352,000	369,000
Unpaid vouchers	460,450	198,206
Unpaid pay-rolls	70,320	37,769
Accounts payable	10,031	71,508
Bills payable	1,280,128	1,995,994
Interest accrued	83,250	84,212
Furnace-repair fd	4,809	27,525
Total	$16,995,989	$17,564,215

Note—For previous annual report of this company see "Coal Age," Vol. 9, p. 522.

Central Coal & Coke Co.

The annual report of this company for the fiscal years ended Jan. 1, shows net earnings by departments for two years as follows:

Credit	1917	1916
Wholesale coal department	$396,543	$291,511
Retail coal department	43,387	18,884
Mining store department	100,927	86,751
Wholesale lumber departm't	41,870	36,811
Miscellaneous	44,707	62,979
Rentals, coal department	32,615	28,272
Total	$673,269	$525,211
Debit	1917	1916
Roy. credit coal lands	$110,670	$108,198
General expenses	77,276	74,918
Interest on bonds	66,480	70,912
Dep. on washery prop., etc	6,651	2,672
Dep. on motor trucks	4,252	4,544
Interest and exchange	61,159	28,804
Washery department		1,528
Live stock exting. reserve	12,196	19,875
Total debit	339,045	311,454
Net earnings	334,223	213,757

In the year ended Jan. 1, 1916 a loss of $28,160 in the Delta Land and Timber Co. operations brought the net profit of the combined companies for the year down to $185,597.

Note—For previous annual report of this company, see Vol. 9, p. 522.

Lehigh & Wilkes-Barre Coal Co.

This company reports for the year ended June 30, 1916, as follows:

The company mined and shipped during the year 4,482,597 tons, a decrease of 460,289 tons. and 90,776 tons were purchased, an increase of 35,979 tons, as compared with the previous year. The tonnage sold was 4,903,623, an increase of 164,878 tons as compared with the previous year. The tonnage of prepared sizes sold equaled 65.25 per cent. and of pea and smaller 35.75 per cent.

Payments under coal leases for rentals were $32,663 in excess of royalty on coal mined during the year and have been charged to operating expense.

All of the bonds which matured June 1, 1915, have been presented for payment and the bonds and coupons have been cremated. Payment of $460,000 was made June 1, 1916, to the trustee as provided in the sinking fund requirements of the consolidated mortgage.

The workmen's compensation law became effective in Pennsylvania Jan. 1, 1916.

The tonnage tax law of Pennsylvania has been declared unconstitutional by the Supreme Court and the company has refunded to its customers the tax collected under that Act. Such amounts as have been collected under the second Act, passed in 1915, are being held pending decision of the courts as to the validity of this second Act.

The new agreement between the anthracite operators and the anthracite mine workers, covering a four-year period Apr. 1, 1916, to Apr. 1, 19120, calls for 8 hr. a day instead of 9 hr., with an advance of 3 per cent. in the day rate and 7 per cent. on contract work.

On June 30, 1916, the company acquired by purchase that portion of the coal storage plant at Hampton, N. J., owned by the Central R.R. Co. of New Jersey, and formerly held under lease.

The new breaker at Wanamie Colliery is practically complete but operation has been suspended pending tearing down the old breaker and installation of engines, etc., which could not be put in place until the old structure had been abandoned. The present indication is that work will be resumed Oct. 1.

TONNAGE, EARNINGS, EXPENSES, ETC.

Tonnage shipped—	1915–16	1914–15
By company	4,482,597	4,942,886
By tenants	704,962	673,412
Total of all	5,187,560	5,616,299
Produced as follows—		
From fee lands	3,534,686	3,889,865
From leased lands	1,303,516	1,438,481
From washeries	349,356	288,052

Earnings—	1915–16	1914–15
Coal sales	$17,565,450	$16,271,085
Coal mined by tenants	135,296	116,372
Miscellaneous	347,234	368,014
Total	$18,047,980	$16,755,471
Expenses—		
Operating collieries, etc	7,859,315	8,235,286
Add'ns, etc., deprec'n	224,130	247,144
Royalty leased prop'ties	412,640	432,598
Coal purchased	127,618	79,837
Transp., yard and ag'y exp.	3,215,376	3,726,939
General expense	108,750	102,636
Taxes, mining property	903,036	753,548
Taxes, Federal and State	304,767	215,506
Insurance (min'g prop.)	24,335	19,427
Depletion of coal prop	439,375	474,424
Maintenance of prop'ty	88,155	54,891
Value of coal stocked	1,065,172	Cr 870,128
Total	$14,772,671	$13,472,109
Net earnings	3,275,309	3,283,362
Deduct—		
Fixed interest on bonds	579,840	671,507
Dividends (13%)	1,197,300	1,197,300
Total deductions	$1,777,140	$1,868,807
Surplus	1,498,169	1,414,555

CONDENSED BALANCE SHEET JUNE 30

Assets—	1916	1915
Property and equipment	$28,747,466	$28,670,330
Advanced royalties for coal	1	1
Cash	3,201,881	405,595
Cash for coup., etc	1,155,067	19,782
Bills and acc'ts rec	1,903,206	1,874,577
Coal on hand	512,244	1,577,417
Land contracts not due	5,659	6,952
Insur., adv. pay'ts	43,510	21,402
Materials and supp	434,046	431,371
Securities of companies owned	371,001	371,001
Marketable securs	6,368,970	6,859,830
Trustees sink. fund 4% consol. loan	460,000	
Compens. fd. inv	61,250	
Suspense accounts	108,335	452,687
Total	$43,372,636	$40,690,944
Liabilities—	1916	1915
Capital stock	$9,210,000	$9,210,000
Funded debt (see "Ry. & Ind." Sec.)	14,496,000	14,509,000
Depletion fund—coal lands	3,243,490	2,704,550
Vouch. and pay-rolls	744,576	771,954
Coup., etc., unpaid	1,155,417	21,182
Pa. State ton. tax	190,196	688,947
Int., mine rents, etc., not due	1,073,639	833,662
Reserve for—New colleries	1,458,239	1,555,438
Breaker and shops	252,319	397,379
Land susp. account	8,310	9,260
Suspense accounts	31,992	55,673
Compensation due employees	78,179	
Fire loss repl. fd		1,789
Profit and loss	11,430,279	9,932,110
Total	$43,372,636	$40,690,944

Note—For previous annual report of this company see Vol. 9, p. 152.

Consolidation Coal Co.—The shareholders on Jan. 25, ratified the proposed increase in authorized capital stock from $39,190,500 to $45,000,000. The "Baltimore Sun" on Jan. 24 said: "The increase is intended to meet the stock dividend of 5 per cent. [$1,250,000] recently declared, and for other purposes which were not disclosed, although it is said that between $4,000,000 and $5,000,000 of the additional stock will be in the hands of the corporation when the increase has been sanctioned. The company now has an authorized capital of $39,190,500. Of this there is outstanding $25,000,000, with the remainder reserved for the convertible bond isues and to meet the 2-year 7 per cent. debenture bonds which fall due Feb. 1. It is generally understood that the whole of this last-named issue is in the hands of the Rockefeller interests. When the bonds were issued it was on the basis that both the principal and interest should be paid in the stock of the company at maturity. It is understood there will be no underwriting for the additional stock. The corporation will provide the means of taking care of it, and it is not likely that any of it will come on the market for sale; certainly there is no such intention in view."